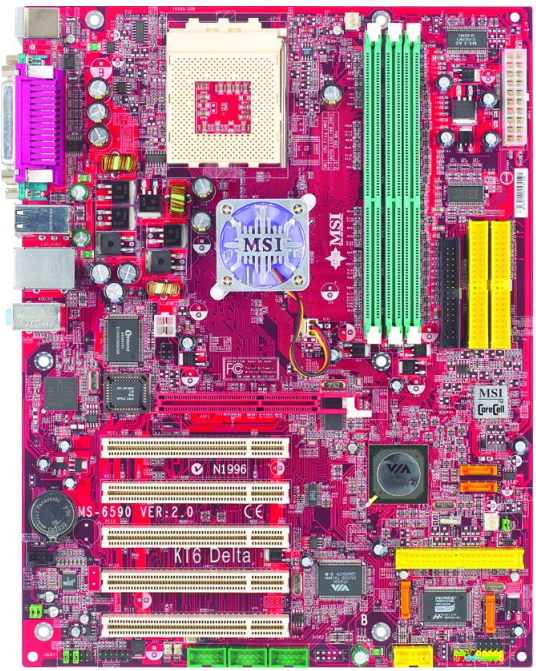
KT6 Delta

MS-6590 (v2.X) ATX Mainboard



Version 2.0

G52-M6590X9-K01

Manual Rev: 2.0
Release Date: July 2003

CE N1996

FCC-B Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Notice 1
The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2
Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.

Micro-Star International MS-6590

FC **Tested to comply with FCC Standard**

For Home or Office Use

Copyright Notice

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Revision History

Revision	Revision History	Date
V2.0	First release with chipset VIA KT600 & VIA VT8237	July 2003

Safety Instructions

1. Always read the safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Keep this equipment away from humidity.
4. Lay this equipment on a reliable flat surface before setting it up.
5. The openings on the enclosure are for air convection hence protects the equipment from overheating. **Do not cover the openings.**
6. Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
7. Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
8. Always Unplug the Power Cord before inserting any add-on card or module.
9. All cautions and warnings on the equipment should be noted.
10. Never pour any liquid into the opening that could damage or cause electrical shock.
11. If any of the following situations arises, get the equipment checked by a service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment has not work well or you can not get it work according to User's Manual.
    - The equipment has dropped and damaged.
    - The equipment has obvious sign of breakage.
12. **Do not leave this equipment in an environment unconditioned, storage temperature above 60^0 C (140^0F), it may damage the equipment.**

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

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Getting Started

Thank you for purchasing KT6 Delta (MS-6590 v2.X) ATX mainboard. The KT6 Delta is based on **VIA® Apollo KT600** & **VT8237** chipsets and provides eight USB 2.0 ports for high-speed data transmission, C-Media 9739A chip for 6-channel audio output and one SPDIF pinheader for digital audio transmission. Designed to fit the advanced **AMD® Athlon™**, **Athlon™ XP** or **Duron™** processors, the KT6 Delta delivers a high performance and professional desktop platform solution.

Mainboard Specifications

CPU

➤ Supports Socket A (Socket-462) for AMD® Athlon™/Athlon™ XP /Duron™ processors.
➤ Supports up to 3200+.

Chipset

➤ VIA® Apollo KT600 chipset
- FSB @200/266/333/400 MHz.
- Supports DDR200/266/333/400 DDR SDRAM.
-AGP 8X and PCI advanced high performance memory controller.

➤ VIA® VT8237 chipset
- Ultra DMA 66/100/133 master mode EIDE controller.
- Integrated dual channel native Serial ATA/RAID controller supplying 150MB/s supporting for RAID 0 and RAID 1
- ACPI & PC2001 compliant enhanced power management.
- Supports 8 USB 2.0 ports

Main Memory

➤ Supports six memory banks using three 184-pin 200/266/333/400 DDR SDRAMs.
➤ DDR400 memory support maximum 4 banks.
➤ Supports up to 3GB memory size.
➤ As to the "DDR 400/PC3200 Qualified Memory Test list" of KT6 Delta, please visit MSI website (http://www.msi.com.tw) and search the mainboard KT6 Delta for details.

Slots

➤ One AGP (Accelerated Graphics Port) slot.
- Supports AGP 3.0.

➤ Five 32-bit PCI bus slots (support 3.3v/5v PCI bus interface).

On-Board IDE

➤ An IDE controller on the VT8237 chipset provides IDE HDD/CD-ROM with PIO, Bus Master and Ultra DMA133/100/66 operation modes.
- Can connect up to four Ultra ATA drives.

➤ Serial ATA/150 controller integrated in VT8237.
- Up to 150MB/sec transfer speeds.
- Can connect up to two Serial ATA drives.
- Supports RAID 0 or RAID 1.

Promise 20378 On-Board (Optional)

➤ Supports Ultra ATA, Serial ATA, Ultra ATA RAID 0 or 1 , Serial ATA RAID 0 or 1, Ultra/Serial ATA RAID 0+1 supported.

➤ Connect up to 2 Serial ATA devices and 2 Ultra ATA 133 devices.

On-Board Peripherals

➤ On-Board Peripherals include:

- 1 floppy port supports 2 FDDs with 360K, 720K, 1.2M, 1.44M and 2.88Mbytes
- 2 serial ports (COM A + COM B)
- 1 parallel port supports SPP/EPP/ECP mode
- 1 IrDA connector for SIR/ASKIR/HPSIR
- 1 audio port
- 8 USB 2.0 ports (Rear * 6/ Front * 2)

Audio

➤ 6 channels software audio codec C-Media 9739A.

- Compliance with AC97 v2.2 Spec.
- Meet PC2001 audio performance requirement.
- Can support SPDIF Out via optional S-Bracket.

LAN 10/100/1000MBps (Optional)

➤ Broadcom 4401/5788

- Integrated Gigabit Ethernet MAC and PHY transceiver, auto-negotiation operation.
- Supports single-port 10MB/s, 100MB/s (for 4401) or 1000MB/s (for 5788) BAST-T application.
- Compliance with PCI v2.2 and LAN on Motherboard (LOM) standard.

BIOS

➤ The mainboard BIOS provides “Plug & Play” BIOS which detects the peripheral devices and expansion cards of the board automatically.

➤ The mainboard provides a Desktop Management Interface (DMI) function which records your mainboard specifications.

➤ ACPI, 1.0a, APM1.2, PnP 1.0a, SMBIOS 2.3, USB 2.0, WFM 2.0, Overclock, Boot from USB device.

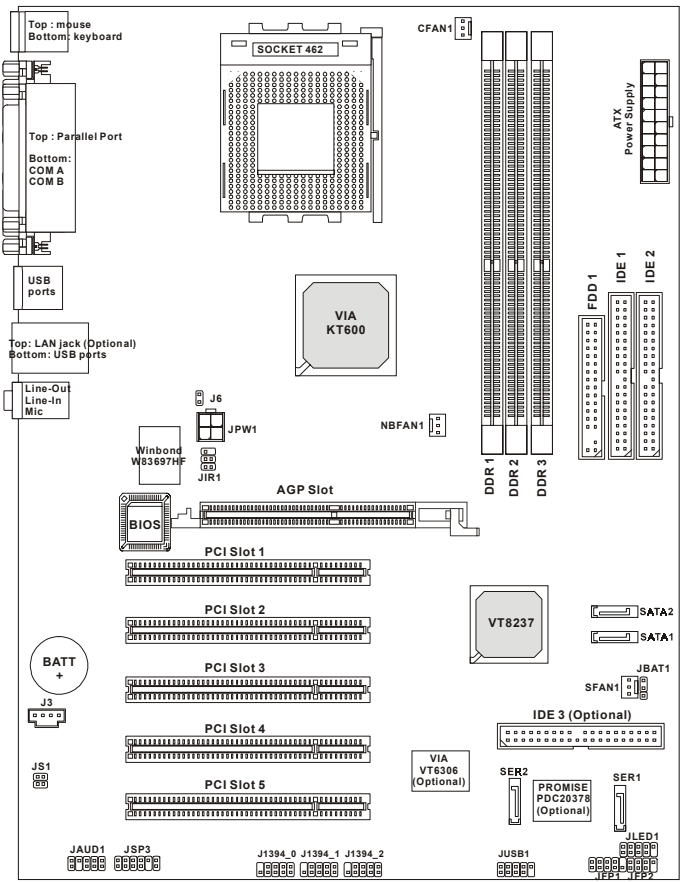
Dimension

➤ ATX Form Factor: 30.5 cm (L) x 23.5 cm (W).

Mounting

➤ 6 mounting holes.

Mainboard Layout



KT6 Delta Series (MS-6590 v2.X) ATX Mainboard

MSI Special Features

Super Pack (Optional)

MSI provides a useful CD which includes 6 powerful and popular utilities for your office professional working and for your home leisure entertainments.

1. Adobe Photoshop Album: The fast and easy way to organize and share your lifetime of photos.
2. Media Ring: A high quality voice service for PC users to make international calls without the elevated cost of traditional IDD providers.
3. FarStone Virtual Drive: A revolutionary software that emulates a physical CD drive.
4. InterVideo WinDVD: The World's Most Popular Software DVD Player.
5. InterVideoWinRip: A state-of-the-art software application that provides you with a complete audio playback and environment.
6. FarStone RestoreIt!: Instantly recover from system crash, virus attack, and accidental data deletion.

Core Center

The Core Center is a new utility you can find in the CD-ROM disk. The utility is just like your PC doctor that can detect, view and adjust the PC hardware and system status during real time operation. In the left side it shows the current system status including the Vcore, 3.3V, +5V and 12V. In the right side it shows the current PC hardware status such as the CPU & system temperatures and all fans speeds.

When you click the red triangles in the left and right sides, two sub-menus will open for users to overclock, overspec or to adjust the thresholds of system to send out the warning messages. If you click the ***Core Center*** button in the top, a screen pops up for you to choose the "***Auto mode***" or "***User mode***" of CPU fan.

Left-side: Current system status

In the left sub-menu, you can configure the settings of FSB, Vcore, Memory Voltage and AGP Voltage by clicking the radio button in front of each item and make it available (the radio button will be lit as yellow when selected), use the "+" and "**-**" buttons to adjust, then click "***OK***" to apply the changes. Then you can click ***Save*** to save the desired FSB you just configured.

Also you may click ***Auto*** to start testing the maximal CPU overclocking value, The CPU FSB will automatically increase the testing value until the PC reboots. Or you may click ***Default*** to restore the default values.

Right-side: PC hardware status during real time operation

In the right sub-menu, here you can configure the PC hardware status such as CPU & system temperatures and fan speeds. You may use the scroll bars to adjust each item, then click "***OK***" to apply the changes. The values you set for the temperatures are the maximum thresholds for the system for warnings, and the value for fan speeds are the minimum thresholds.

Top-side: User mode/Auto mode

Here you may adjust the CPU fan speed. If you choose ***User mode***, you may adjust the CPU fan speed in 8 different modes, from **Stop** to **Full speed**.

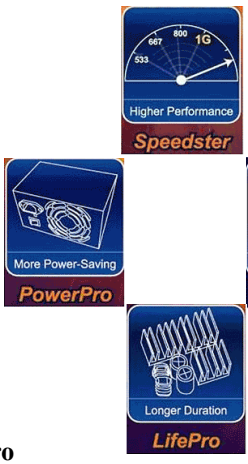
Core Cell™ Chip

By diagnosing the current system utilization, the CoreCell™ Chip automatically tunes your motherboard to the optimal state, leading to less noise, longer duration, more power-saving and higher performance.

Features of CoreCell™

Speedster

-- Advanced O.C. design.
-- Superior O.C. capability.
-- Greater O.C. method.

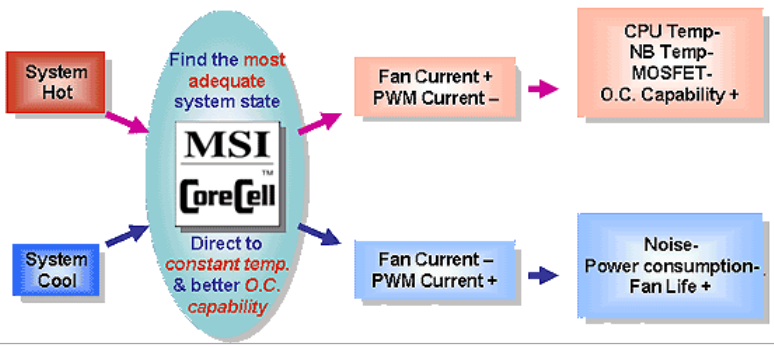


BuzzFree

-- Diagnoses current system utilization & temperature.
-- Controls both CPU and NorthBridge fans.
-- Cuts up to 50% of system noise.

LifePro

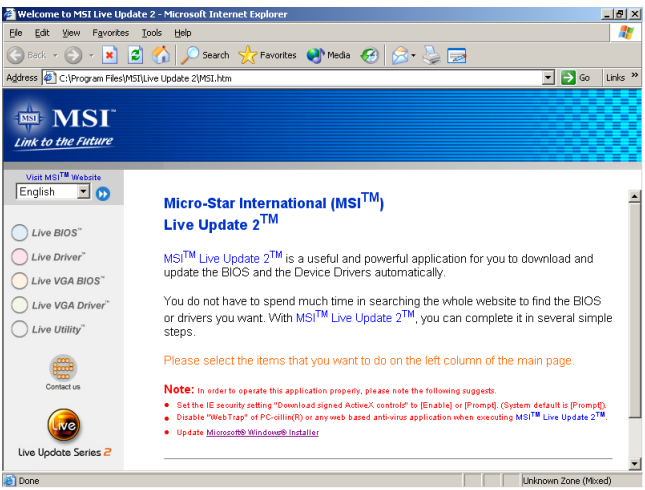
-- Prolongs motherboard, CPU and fan life.
-- Maintains motherboard & CPU in constant temperature.
-- Prevents components from operating beyond specifications.



Live BIOS™/Live Driver™

The Live BIOS™/Live Driver™ is a tool used to detect and update your BIOS/drivers online so that you don't need to search for the correct BIOS/driver version throughout the Web site. To use the function, you need to install the "MSI Live Update 2" application. After installation, the "MSI Live Update 2" icon (as shown on the right) will appear on the screen.

Double click the "MSI Live Update 2" icon, and the following screen will appear:



Five buttons are placed on the leftmost pane of the screen. Click the desired button to start the update process.

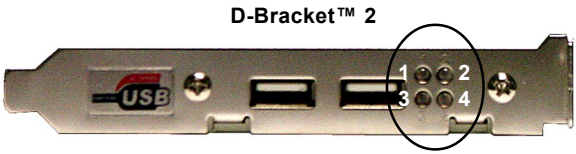
- **Live BIOS** – Updates the BIOS online.
- **Live Driver** – Updates the drivers online.
- **Live VGA BIOS** – Updates the VGA BIOS online.
- **Live VGA Driver** – Updates the VGA driver online.
- **Live Utility** – Updates the utilities online.

If the product you purchased does not support any of the functions listed above, a "sorry" message is displayed. For more information on the update instructions, insert the companion CD and refer to the "Live Update Guide"

D-Bracket™ 2 (Optional)

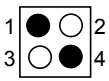
D-Bracket™ 2 is an external USB bracket integrating four Diagnostic LEDs, which use graphic signal display to help users understand their system. The LEDs provide up to 16 combinations of signals to debug the system. The 4 LEDs can debug all problems that fail the system, such as VGA, RAM or other failures. This special feature is very useful for the overclocking users. These users can use the feature to detect if there are any problems or failures.

D-Bracket™ 2 supports both USB 1.1 & 2.0 specification.



● Red ○ Green

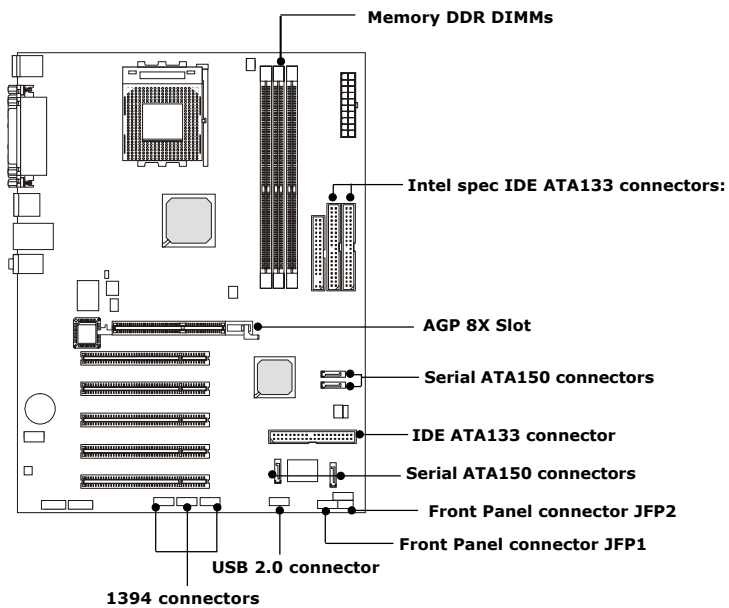
D-Bracket™2	Description
	System Power ON - The D-LED will hang here if the processor is damaged or not installed properly.
	Early Chipset Initialization
	Memory Detection Test - Testing onboard memory size. The D-LED will hang if the memory module is damaged or not installed properly.
	Decompressing BIOS image to RAM for fast booting.
	Initializing Keyboard Controller.
	Testing VGA BIOS - This will start writing VGA sign-on message to the screen.

D-Bracket™2	Description
	Processor Initialization - This will show information regarding the processor (like brand name, system bus, etc…)
	Testing RTC (Real Time Clock)
	Initializing Video Interface - This will start detecting CPU clock, checking type of video onboard. Then, detect and initialize the video adapter.
	BIOS Sign On - This will start showing information about logo, processor brand name, etc….
	Testing Base and Extended Memory - Testing base memory from 240K to 640K and extended memory above 1MB using various patterns.
	Assign Resources to all ISA.
	Initializing Hard Drive Controller - This will initialize IDE drive and controller.
	Initializing Floppy Drive Controller - This will initializing Floppy Drive and controller.
	Boot Attempt - This will set low stack and boot via INT 19h.
	Operating System Booting

Color Management

MSI has an unified color management rule for some connectors on the mainboards, which helps you to install the memory modules, expansion cards and other peripherals devices more easily and conveniently.

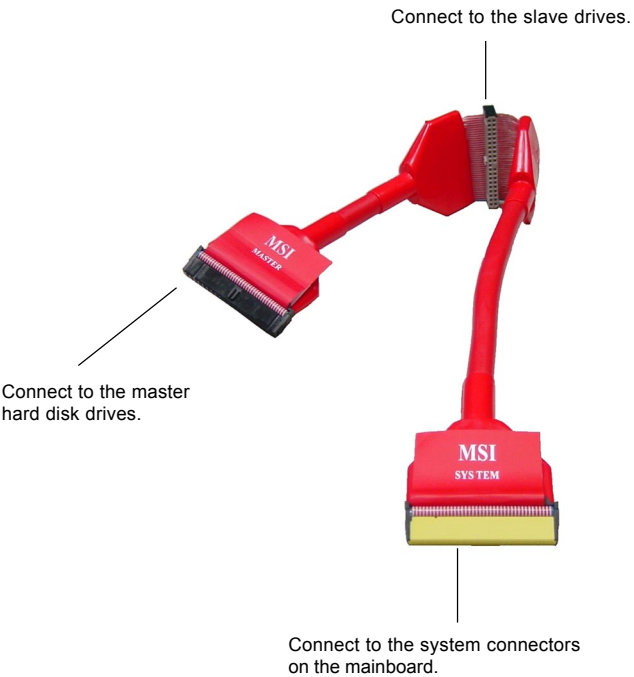
- Single DDR DIMMs: Light green
- Intel spec IDE ATA66/100 connector: 1st IDE in blue, 2nd IDE in white
- IDE ATA133 connector: yellow
- Serial ATA150 connector: orange
- AGP 8X slot: red
- 1394 connector: dark green
- USB 2.0 connector: yellow
- Front panel connector JFP1 : HDD LED in red, Reset Switch in blue, Power Switch in black, Power LED in light green.
- Front panel connector JFP2: Power LED in light green.



Round Cable (Optional)

Round cable is an enhanced cable for PCI IDE and Ultra DMA controller. It has the following benefits:

- ➤ Data transfer rate started by 133MB/s
- ➤ Backward compatibility (ATA33/66/100/133)
- ➤ Higher performance than traditional Flat cable (data rate)
- ➤ Improved data robustness
- ➤ Better airflow due to thinner ATA/133 cable

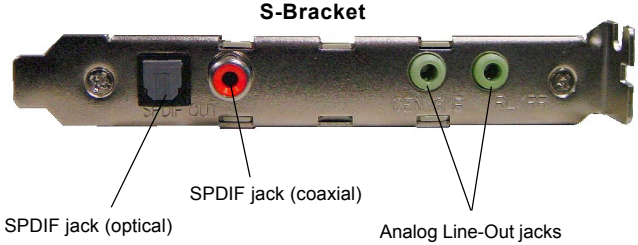


S-Bracket (Optional)

S-Bracket is a bracket which provides 2 SPDIF jacks for digital audio transmission and 2 analog Line-Out connectors for additional 4-channel analog audio output. With the S-Bracket, your system will be able to perform 6-channel audio operation for wonderful surround sound effect, or connect to Sony & Philips Digital Interface (SPDIF) speakers for audio transmission with better quality.

The S-Bracket offers two types of SPDIF connectors: one for optical fiber and the other for coaxial connection. Select the appropriate one to meet your need. For more information on S-Bracket, refer to *Appendix. Using 4- or 6-Channel Audio Function*.

S-Bracket

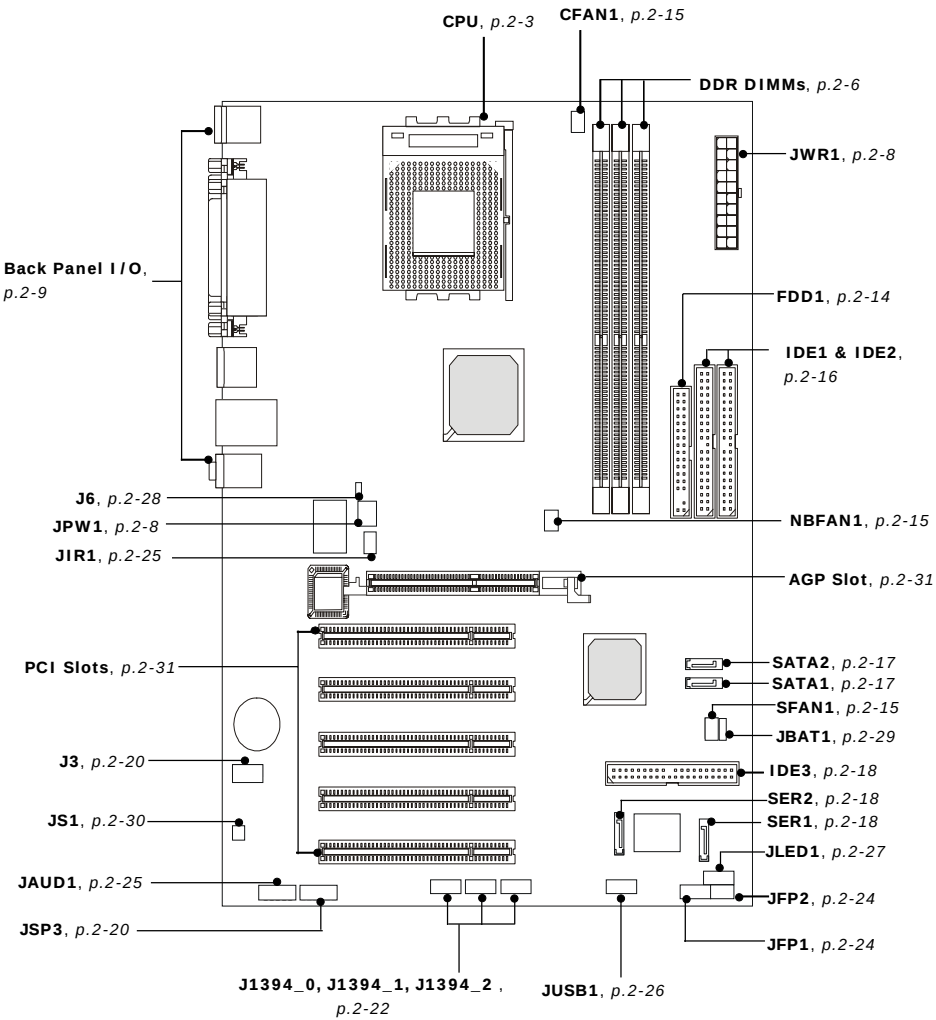


Hardware Setup

This chapter tells you how to install the CPU, memory modules, and expansion cards, as well as how to setup the jumpers on the mainboard. Also, it provides the instructions on connecting the peripheral devices, such as the mouse, keyboard, etc.

While doing the installation, be careful in holding the components and follow the installation procedures.

Quick Components Guide



Central Processing Unit: CPU

The mainboard supports AMD® Athlon™, Athlon™ XP and Duron™ processors in the 462 pin package. The mainboard uses a CPU socket called Socket-462 for easy CPU installation. When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not find the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

CPU Core Speed Derivation Procedure

If	CPU Clock	=	100MHz
	Core/Bus ratio	=	14
then	CPU core speed	=	Host Clock x Core/Bus ratio
		=	100MHz x 14
		=	1.4 GHz

Memory Speed/CPU Clock Support Matrix

CPU Clock \ Memory	DDR 200	DDR 266	DDR 333	DDR 400
100 MHz	○	○	X	X
133 MHz	X	○	○	○
166 MHz	X	○	○	○
200 MHz	X	○	○	Note 1

○: Yes.

Note 1: 6 banks support. Please refer to <www.msi.com.tw> KT6 Delta page for the latest qualified memory list to ensure the system stability.

X: Not available .

WARNING!

Thermal Issue for CPU

AMD Athlon™/Athlon™ XP/Duron™ processor with a speed of **600MHz and above** requires LARGER heatsink and fan. You also need to add thermal grease between the CPU and heatsink to improve heat dissipation. Then, make sure that the CPU and heatsink are securely fastened and in good contact with each other. These are needed to prevent damaging the processor and ensuring reliable operation. You can check AMD's web site for more information.

CPU Installation Procedures for Socket 462

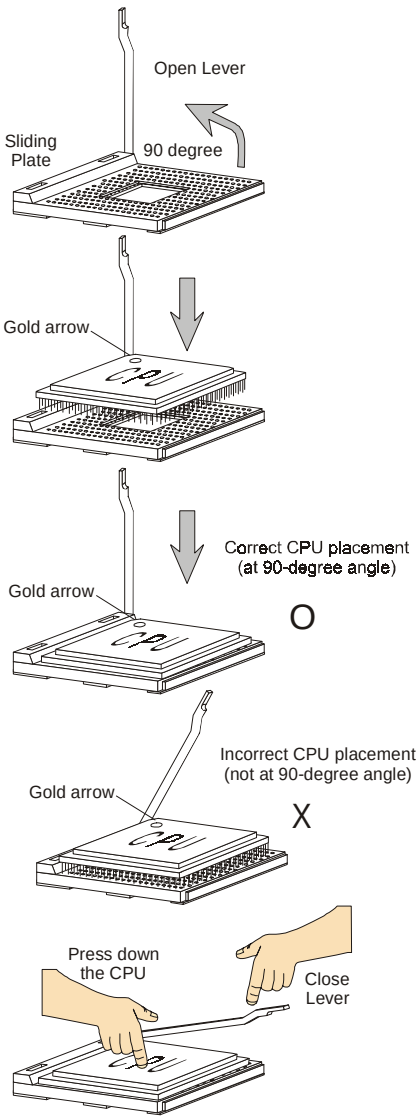
1. Please turn off the power and unplug the power cord before installing the CPU.

2. Pull the lever sideways away from the socket. Make sure to raise the lever up to a 90-degree angle.

3. Look for the gold arrow. The gold arrow should point towards the lever pivot. The CPU can only fit in the correct orientation.

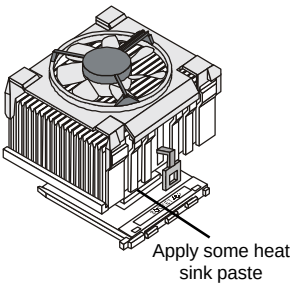
4. If the CPU is correctly installed, the pins should be completely embedded into the socket and can not be seen. Please note that any violation of the correct installation procedures may cause permanent damages to your mainboard.

5. Press the CPU down firmly into the socket and close the lever. As the CPU is likely to move while the lever is being closed, always close the lever with your fingers pressing tightly on top of the CPU to make sure the CPU is properly and completely embedded into the socket.

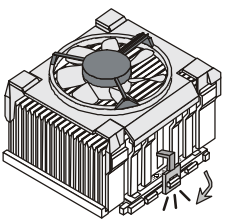


Installing AMD Athlon CPU (Socket 462) Cooler Set

The following instructions will guide you through the heat sink installation procedures. Please consult your agent for the proper CPU cooler set.

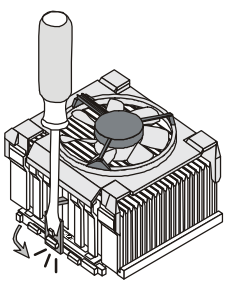


1. Position your CPU cooler set onto the CPU.



2. Use one end of the clip to hook the latch of the CPU sliding plate.

3. Hook the other latch to fix the cooling fan set. You may need a screw drive to press down the other side of the clip.

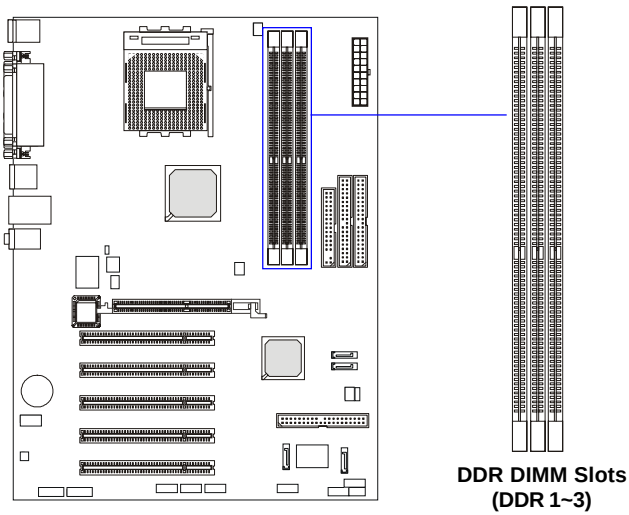


4. Connect the fan to the power supply connector provided on your mainboard.

MSI Reminds You...
Please apply some heat sink paste on top of CPU to dissipate the heat more effectively.

Memory

The mainboard provides 3 slots for 184-pin DDR SDRAM DIMM (Double In-Line Memory Module) modules and supports the memory size up to 3GB. You can install PC3200/DDR400, PC2700/DDR333, PC2100/ DDR266 or PC1600/DDR200 modules on the DDR DIMM slots (DDR 1~3).



DDR DIMM Slots
(DDR 1~3)

Introduction to DDR SDRAM

DDR (Double Data Rate) SDRAM is similar to conventional SDRAM, but doubles the rate by transferring data twice per cycle. It uses 2.5 volts as opposed to 3.3 volts used in SDR SDRAM, and requires 184-pin DIMM modules rather than 168-pin DIMM modules used by SDR SDRAM. High memory bandwidth makes DDR an ideal solution for high performance PC, workstations and servers.

DDR DIMM Module Combination

Install at least one DIMM module on the slots. Memory modules can be installed on the slots in any order. You can install either single- or double-sided modules to meet your own needs.

Memory modules can be installed in any combination as follows:

Slot	Memory Module	Total Memory
DIMM 1 (Bank 0 & 1)	S/D	64MB~1GB
DIMM 2 (Bank 2 & 3)	S/D	64MB~1GB
DIMM 3 (Bank 4 & 5)	S/D	64MB~1GB
Maximum System Memory Supported		64MB~3GB

S: Single Side **D: Double Side**

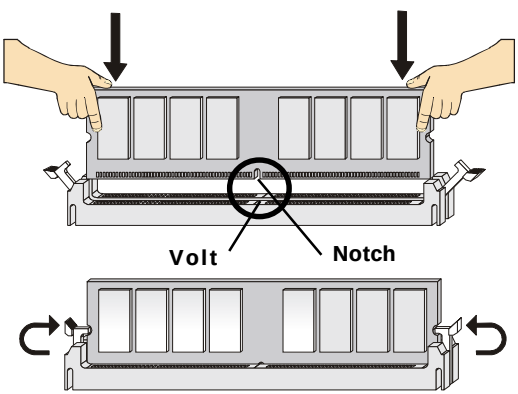
Installing DDR Modules

1. The DDR DIMM has only one notch on the center of module. The module will only fit in the right orientation.

2. Insert the DIMM memory module vertically into the DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the socket.

MSI Reminds You...
You can barely see the golden finger if the module is properly inserted in the socket.

3. The plastic clip at each side of the DIMM slot will automatically close.

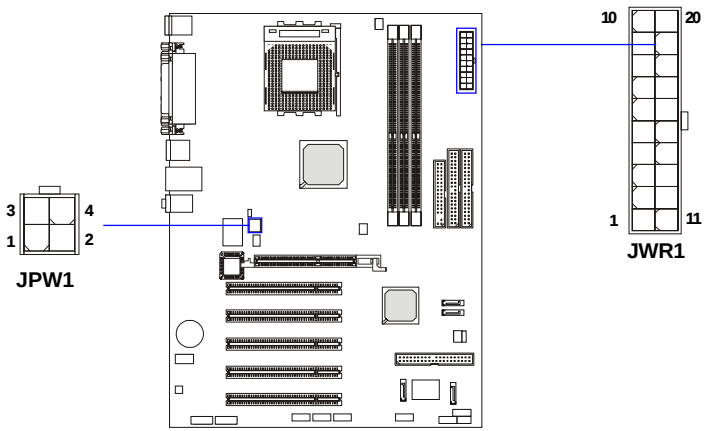


Power Supply

The mainboard supports ATX power supply for the power system. Before inserting the power supply connector, always make sure that all components are installed properly to ensure that no damage will be caused.

ATX 20-Pin Power Connector: JWR1

This connector allows you to connect to an ATX power supply. To connect to the ATX power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.



JPW1 Pin Definition

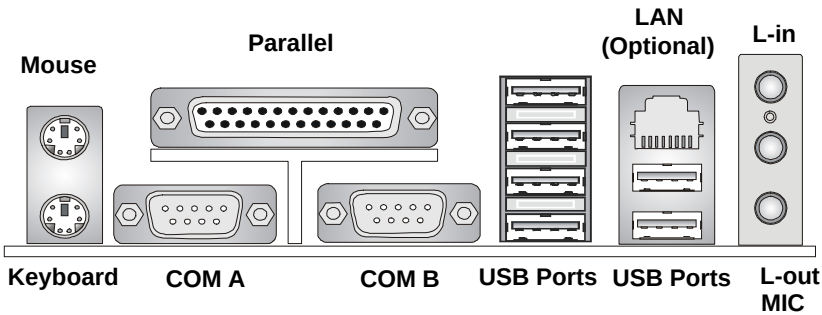
PIN	SIGNAL
1	GND
2	GND
3	12V
4	12V

JWR1 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	GND	13	GND
4	5V	14	PS_ON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PW_OK	18	-5V
9	5V_SB	19	5V
10	12V	20	5V

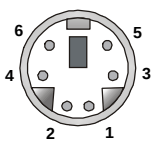
Back Panel

The back panel provides the following connectors:



Mouse Connector

The mainboard provides a standard PS/2® mouse mini DIN connector for attaching a PS/2® mouse. You can plug a PS/2® mouse directly into this connector. The connector location and pin assignments are as follows:



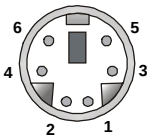
PS/2 Mouse (6-pin Female)

Pin Definition

PIN	SIGNAL	DESCRIPTION
1	Mouse DATA	Mouse DATA
2	NC	No connection
3	GND	Ground
4	VCC	+5V
5	Mouse Clock	Mouse clock
6	NC	No connection

Keyboard Connector

The mainboard provides a standard PS/2® keyboard mini DIN connector for attaching a PS/2® keyboard. You can plug a PS/2® keyboard directly into this connector.



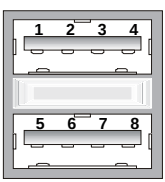
PS/2 Keyboard (6-pin Female)

Pin Definition

PIN	SIGNAL	DESCRIPTION
1	Keyboard DATA	Keyboard DATA
2	NC	No connection
3	GND	Ground
4	VCC	+5V
5	Keyboard Clock	Keyboard clock
6	NC	No connection

USB 2.0 Connectors

The mainboard provides a UHCI (Universal Host Controller Interface) Universal Serial Bus root for attaching USB devices such as keyboard, mouse or other USB-compatible devices. You can plug the USB device directly into the connector.



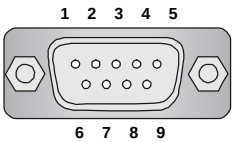
USB Ports

USB Port Description

PIN	SIGNAL	DESCRIPTION
1	VCC	+5V
2	-Data 0	Negative Data Channel 0
3	+Data0	Positive Data Channel 0
4	GND	Ground
5	VCC	+5V
6	-Data 1	Negative Data Channel 1
7	+Data 1	Positive Data Channel 1
8	GND	Ground

Serial Port Connectors: COM A & COM B

The mainboard offers two 9-pin male DIN connectors as serial port COM A & COM B. The ports are 16550A high speed communication ports that send/receive 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connectors.



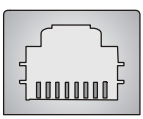
9-Pin Male DIN Connector

Pin Definition

PIN	SIGNAL	DESCRIPTION
1	DCD	Data Carry Detect
2	SIN	Serial In or Receive Data
3	SOUT	Serial Out or Transmit Data
4	DTR	Data Terminal Ready)
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicate

RJ-45 LAN Jack (Optional)

The mainboard provides one standard RJ-45 jack for connection to Local Area Network (LAN). You can connect a network cable to the LAN jack.



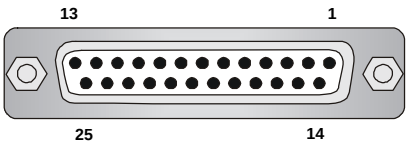
RJ-45 LAN Jack

Pin Definition

PIN	SIGNAL	DESCRIPTION
1	TDP	Transmit Differential Pair
2	TDN	Transmit Differential Pair
3	RDP	Receive Differential Pair
4	NC	Not Used
5	NC	Not Used
6	RDN	Receive Differential Pair
7	NC	Not Used
8	NC	Not Used

Parallel Port Connector: LPT1

The mainboard provides a 25-pin female centronic connector as LPT. A parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) mode.



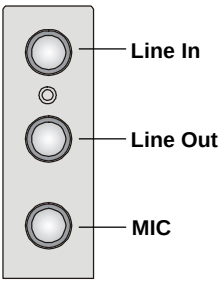
Pin Definition

PIN	SIGNAL	DESCRIPTION
1	STROBE	Strobe
2	DATA0	Data0
3	DATA1	Data1
4	DATA2	Data2
5	DATA3	Data3
6	DATA4	Data4
7	DATA5	Data5
8	DATA6	Data6
9	DATA7	Data7
10	ACK#	Acknowledge
11	BUSY	Busy
12	PE	Paper End
13	SELECT	Select
14	AUTO FEED#	Automatic Feed
15	ERR#	Error
16	INIT#	Initialize Printer
17	SLIN#	Select In
18	GND	Ground
19	GND	Ground
20	GND	Ground
21	GND	Ground
22	GND	Ground
23	GND	Ground
24	GND	Ground
25	GND	Ground

Audio Port Connectors

Line Out is a connector for Speakers or Headphones. **Line In** is used for external CD player, Tape player, or other audio devices. **Mic** is a connector for microphones.

1/8" Stereo Audio Connectors



MSI Reminds You...

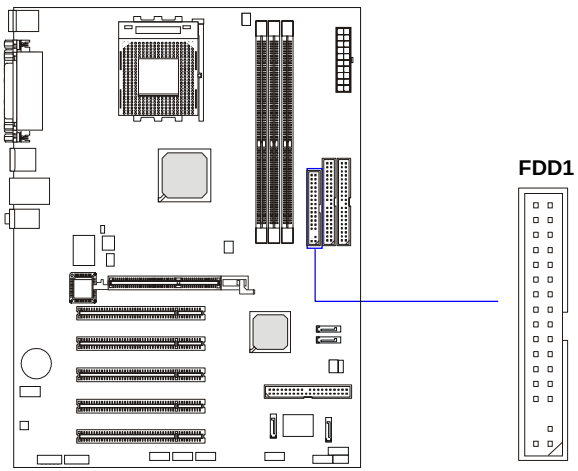
*For advanced audio application, CMedia 9739A is provided to offer support for **6-channel audio operation** and can turn rear audio connectors from 2-channel to 4-/6-channel audio. For more information on **6-channel audio operation**, please refer to Appendix. Using 4- or 6-Channel Audio Function.*

Connectors

The mainboard provides connectors to connect to FDD, IDE HDD, case, LAN, USB Ports, IR module and CPU/System/Power Supply FAN.

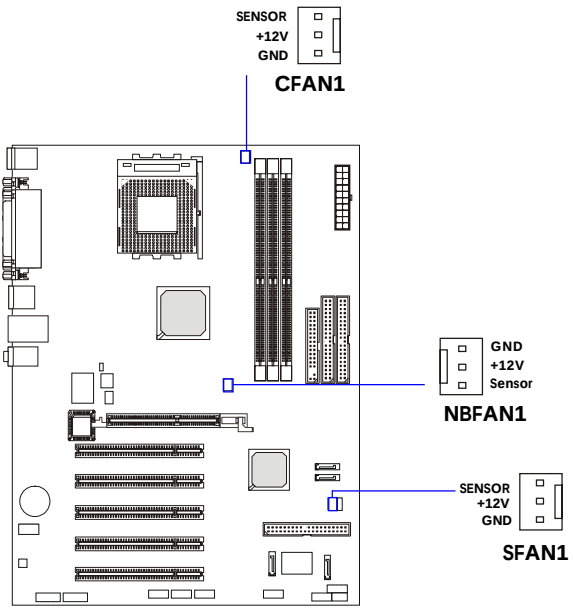
Floppy Disk Drive Connector: FDD1

The mainboard provides a standard floppy disk drive connector that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types.



Fan Power Connectors: CFAN1/SFAN1/NBFAN1

The CFAN1 (processor fan), SFAN1 (system fan) and NBFAN1 (NorthBridge fan) support system cooling fan with +12V. It supports three-pin head connector. When connecting the wire to the connectors, always take note that the red wire is the positive and should be connected to the +12V, the black wire is Ground and should be connected to GND. If the mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

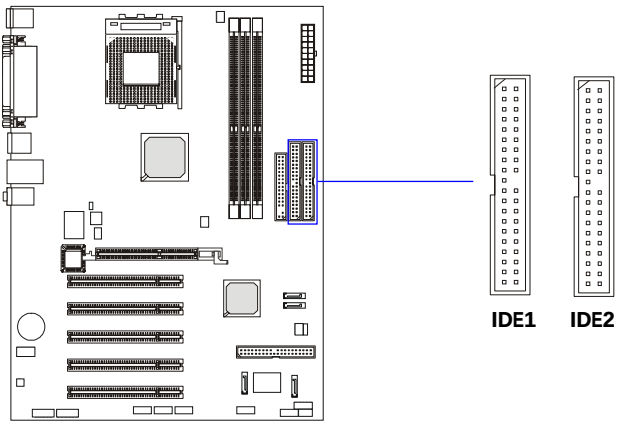


MSI Reminds You...

1. Always consult the vendors for proper CPU cooling fan.
2. CFAN1 supports the fan control. You can install the Core Center utility that will automatically control the CPU fan speed according to the actual CPU temperature.

Hard Disk Connectors: IDE1 & IDE2

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 66/100/133 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 66/100/133 function. You can connect up to four hard disk drives, CD-ROM, 120MB Floppy and other devices.



IDE1 (Primary IDE Connector)

The first hard drive should always be connected to IDE1. IDE1 can connect a Master and a Slave drive. You must configure second hard drive to Slave mode by setting the jumper accordingly.

IDE2 (Secondary IDE Connector)

IDE2 can also connect a Master and a Slave drive.

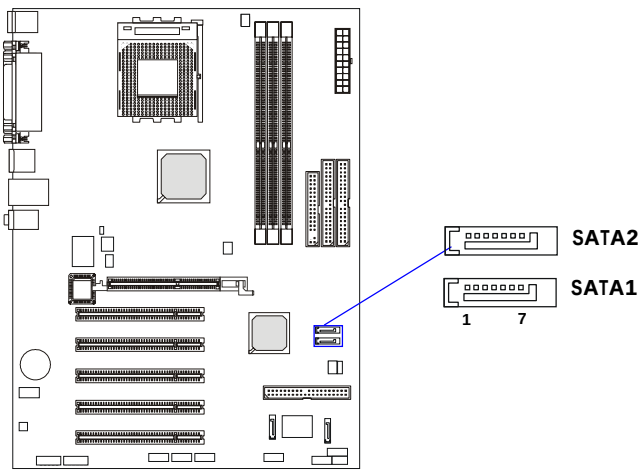
MSI Reminds You...

If you install two hard disks on cable, you must configure the second drive to Slave mode by setting its jumper. Refer to the hard disk documentation supplied by hard disk vendors for jumper setting instructions.

Serial ATA/Serial ATA RAID Connectors controlled by VT8237: SATA1 & SATA2

The Southbridge of this mainboard is VIA VT8237 which supports two serial connectors SATA1& SATA2.

SATA1 & SATA2 are dual high-speed Serial ATA interface ports. Each supports 1st generation serial ATA data rates of 150 MB/s. Both connectors are fully compliant with Serial ATA 1.0 specifications. Each Serial ATA connector can connect to 1 hard disk device. Please refer to *Serial ATA/Serial ATA Raid* manual for detail software installation procedure.

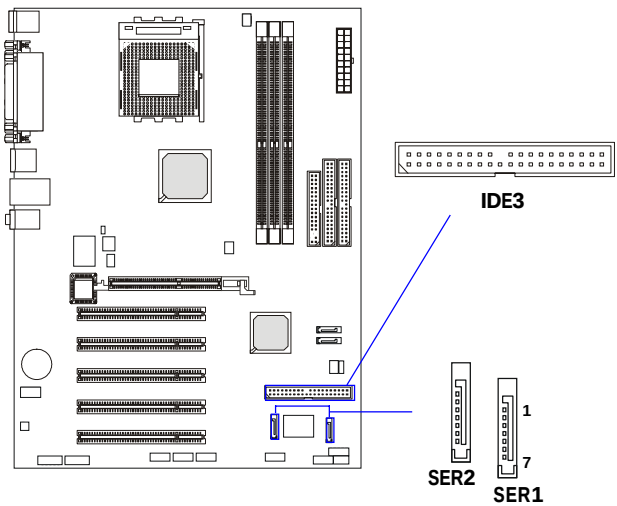


Hard Disk RAID Connectors controlled by Promise20378: IDE3, SER1 & SER2 (Optional)

The brand new Promise 20378 chipset supports one IDE connector IDE3 and two serial connectors SER1& SER2.

IDE3 is a 32-bit Enhanced PCI IDE and Ultra DMA 66/100/133 controller that provides PIO mode 0~6, Bus Master, and Ultra DMA 66/100/133 function. You can connect up to 2 hard disk drives---one IDE master and one IDE slave.

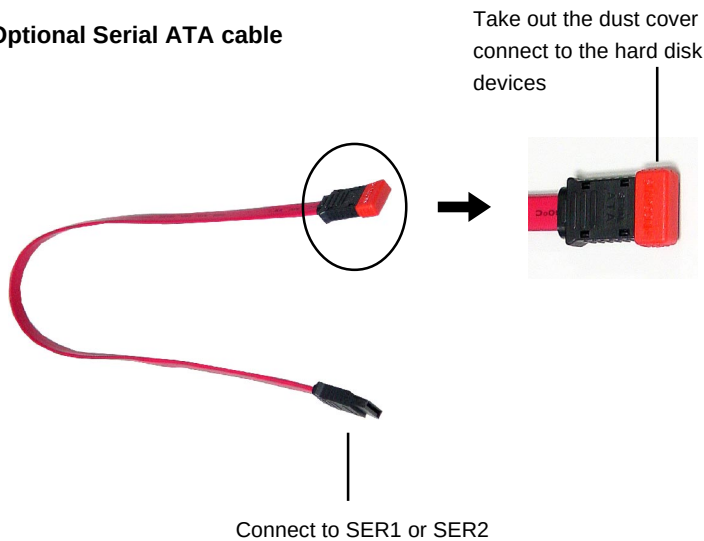
And SER1 & SER2 are dual high-speed Serial ATA interface ports. Each supports 1st generation serial ATA data rates of 150 MB/s. Both connectors are fully compliant with Serial ATA 1.0 specifications. Each Serial ATA connector can connect to 1 hard disk device. Please refer to *Serial ATA/Serial ATA Raid* manual for detail software installation procedure.



SER1 & SER2 Pin Definition

Pin	Signal	Pin	Signal
1	GND	2	TXP
3	TXN	4	GND
5	RXN	6	RXP
7	GND		

Optional Serial ATA cable



MSI Reminds You...

Please do not fold the serial ATA cable in a 90-degree angle, which will cause the loss of data during the transmission.

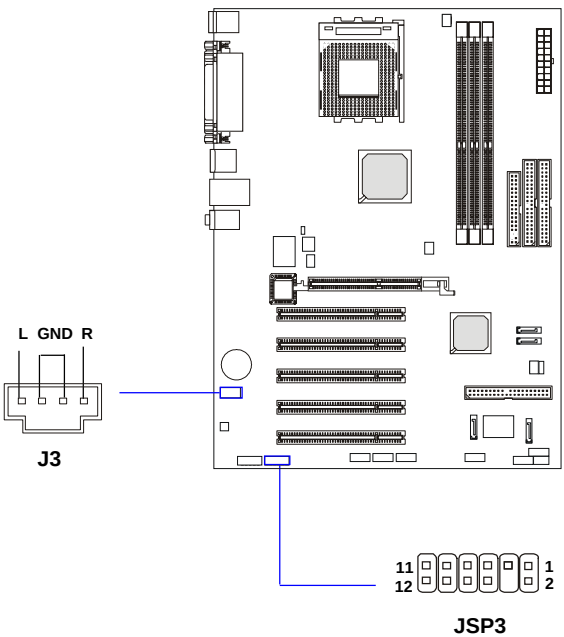
CD-In Connector: J3

The connector is for CD-ROM audio connector.

S-Bracket (SPDIF) Connector: JSP3 (Optional)

The connector allows you to connect a S-Bracket for Sony & Philips Digital Interface (SPDIF). The S-Bracket offers 2 SPDIF jacks for digital audio transmission (one for optical fiber connection and the other for coaxial), and 2 analog Line-Out jacks for 4-channel audio output.

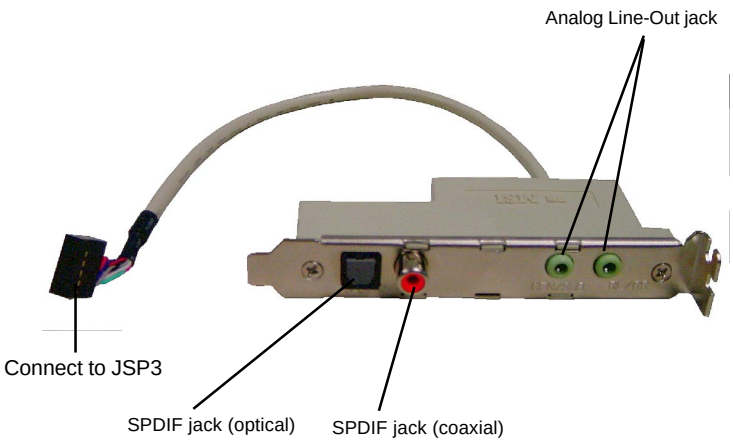
To attach the fiber-optic cable to optical SPDIF jack, you need to remove the plug from the jack first. The two SPDIF jacks support *SPDIF output* only. For more information on the S-Bracket, refer to *Appendix: Using 4- or 6-Channel Audio Function*.



JSP3 Pin Definition

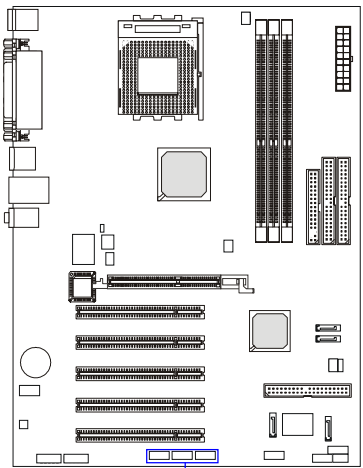
PIN	SIGNAL	DESCRIPTION	PIN	SIGNAL	DESCRIPTION
1	VCC5	VCC 5V	2	VDD3	VDD 3.3V
3	SPDFO	S/PDIF output	4	(No Pin)	Key
5	GND	Ground	6	SPDIF	S/PDIF input
7	LFE-OUT	Audio bass output	8	SOUT-R	Audio right surrounding output
9	CET-OUT	Audio center output	10	SOUT-L	Audio left surrounding output
11	GND	Ground	12	GND	Ground

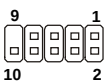
Optional S-Bracket



IEEE 1394 Connectors: J1394_0, J1394_1, J1394_2 (Optional)

The mainboard provides three 1394 pin headers that allow you to connect optional IEEE 1394 ports.



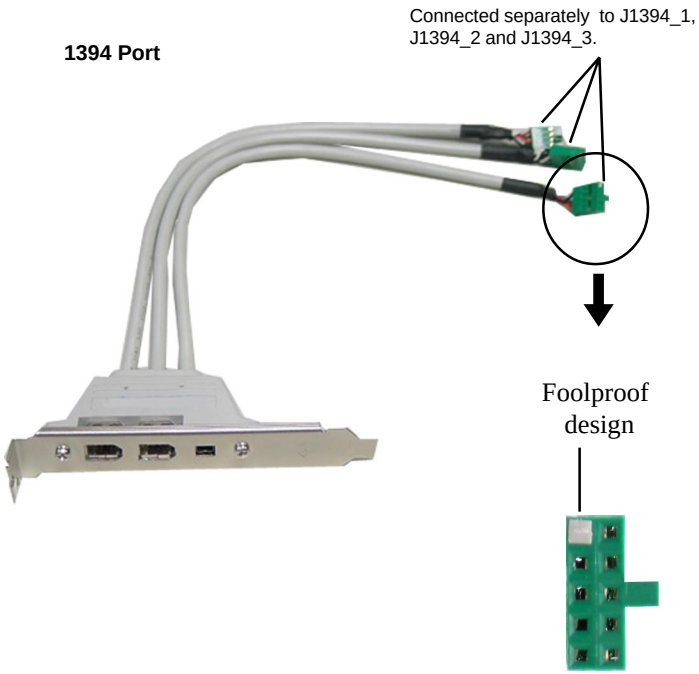


J1394_0, J1394_1, J1394_2

J1394 Pin Definition

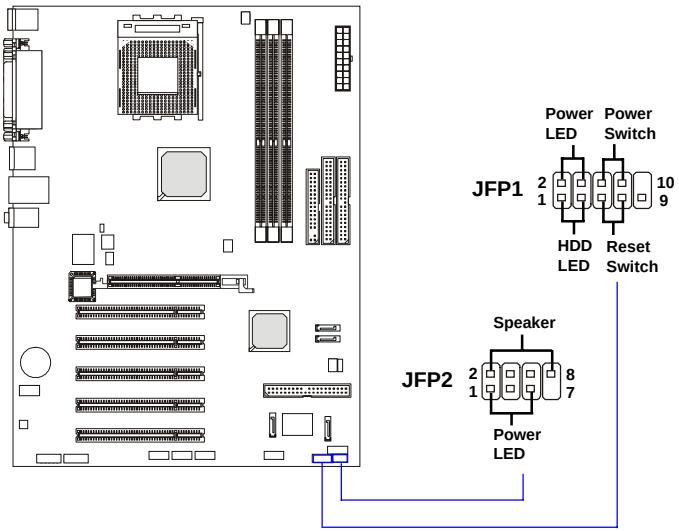
PIN	SIGNAL	PIN	SIGNAL
1	TPA+	2	TPA-
3	Ground	4	Ground
5	TPB+	6	TPB-
7	Cable power	8	Cable power
9	Key (no pin)	10	Ground

How to attach the IEEE 1394 Port:



Front Panel Connectors: JFP1 & JFP2

The mainboard provides two front panel connectors for electrical connection to the front panel switches and LEDs. JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.



JFP1 Pin Definition

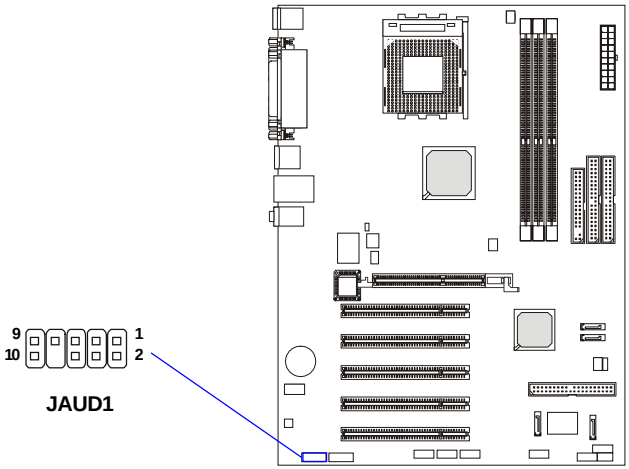
PIN	SIGNAL	DESCRIPTION
1	HD_LED_P	Hard disk LED pull-up
2	FP PWR/SLP	MSG LED pull-up
3	HD_LED_N	Hard disk active LED
4	FP PWR/SLP	MSG LED pull-up
5	RST_SW_N	Reset Switch low reference pull-down to GND
6	PWR_SW_P	Power Switch high reference pull-up
7	RST_SW_P	Reset Switch high reference pull-up
8	PWR_SW_N	Power Switch low reference pull-down to GND
9	RSVD_DNU	Reserved. Do not use.

JFP2 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	GND	2	SPK-
3	SLED	4	BUZ+
5	PLED	6	BUZ-
7	NC	8	SPK+

Front Panel Audio Connector: JAUD1

The JAUD1 front panel audio connector allows you to connect to the front panel audio and is compliant with Intel® Front Panel I/O Connectivity Design Guide.



JAUD1 Pin Definition

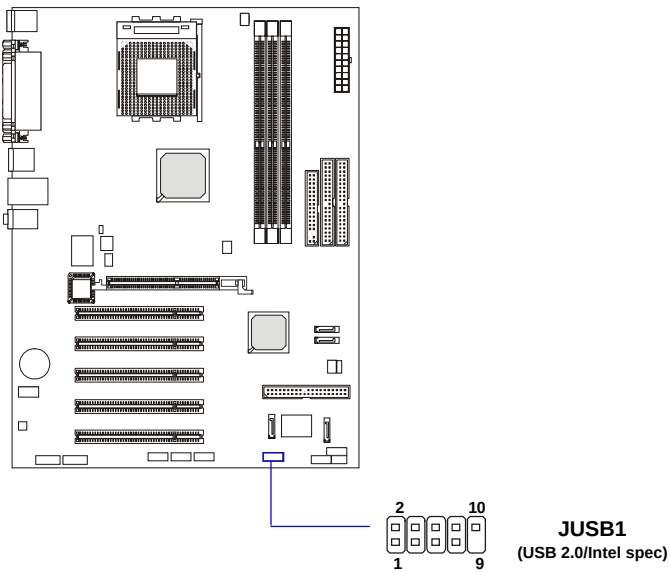
PIN	SIGNAL	DESCRIPTION
1	AUD_MIC	Front panel microphone input signal
2	AUD_GND	Ground used by analog audio circuits
3	AUD_MIC_BIAS	Microphone power
4	AUD_VCC	Filtered +5V used by analog audio circuits
5	AUD_FPOUT_R	Right channel audio signal to front panel
6	AUD_RET_R	Right channel audio signal return from front panel
7	HP_ON	Reserved for future use to control headphone amplifier
8	KEY	No pin
9	AUD_FPOUT_L	Left channel audio signal to front panel
10	AUD_RET_L	Left channel audio signal return from front panel

MSI Reminds You...

If you don't want to connect to the front audio header, pins 5 & 6, 9 & 10 have to be jumpered in order to have signal output directed to the rear audio ports. Otherwise, the Line-Out connector on the back panel will not function.

Front USB Connectors: JUSB1

The mainboard provides one USB 2.0 pin headers *JUSB1* that is compliant with Intel® I/O Connectivity Design Guide. USB 2.0 technology increases data transfer rate up to a maximum throughput of 480Mbps, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as **USB HDD**, **digital cameras**, **MP3 players**, **printers**, **modems and the like**.



JUSB1 Pin Definition

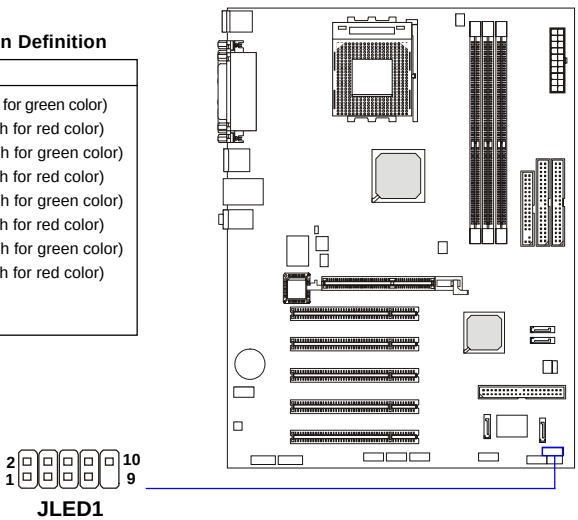
PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key	10	USBOC

D-Bracket™ 2 Connector: JLED1 (Optional)

The mainboard comes with a JLED1 connector for you to connect to D-Bracket™ 2. D-Bracket™ 2 is a USB Bracket that supports both USB1.1 & 2. 0 spec. It integrates four LEDs and allows users to identify system problem through 16 various combinations of LED signals. For definitions of 16 signal combinations, please refer to *D-Bracket™ 2* in *Chapter 1*.

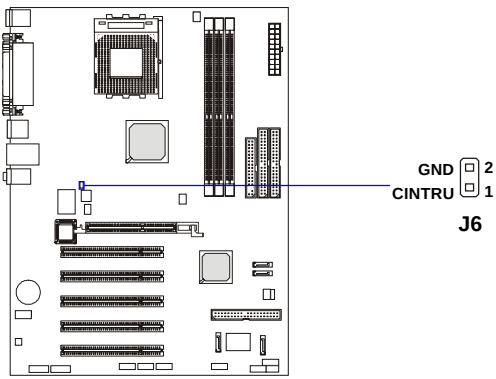
JLED1 Pin Definition

Pin	Signal
1	DBG1 (high for green color)
2	DBR1 (high for red color)
3	DBG2 (high for green color)
4	DBR2 (high for red color)
5	DBG3 (high for green color)
6	DBR3 (high for red color)
7	DBG4 (high for green color)
8	DBR4 (high for red color)
9	Key
10	NC



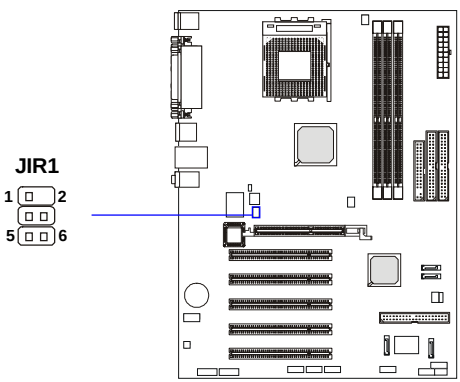
Chassis Intrusion Switch Connector: J6

This connector is connected to a 2-pin chassis switch. If the chassis is opened, the switch will be short. The system will record this status and show a warning message on the screen. To clear the warning, you must enter the BIOS utility and clear the record.



IrDA Infrared Module Header: JIR1

The connector allows you to connect to IrDA Infrared module. You must configure the setting through the BIOS setup to use the IR function. JIR1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.



Pin Definition

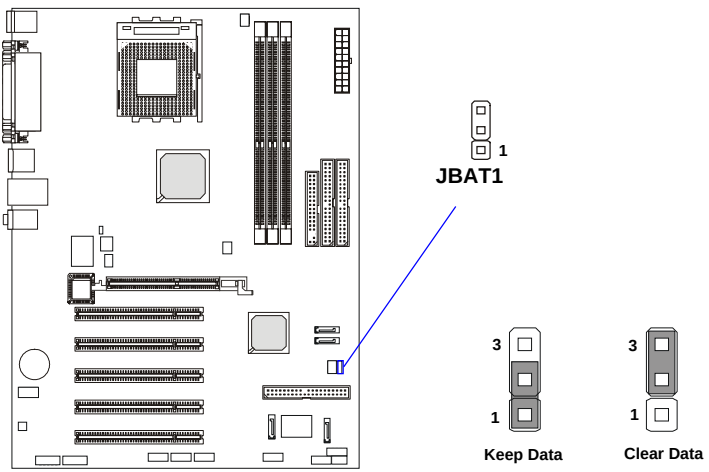
Pin	Signal
1	NC
2	NC
3	VCC5
4	GND
5	IRTX
6	IRRX

Jumpers

The motherboard provides the following jumpers for you to set the computer's function. This section will explain how to change your motherboard's function through the use of jumpers.

Clear CMOS Jumper: JBAT1

There is a CMOS RAM on board that has a power supply from external battery to keep the data of system configuration. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, use the JBAT1 (Clear CMOS Jumper) to clear data. Follow the instructions below to clear the data:



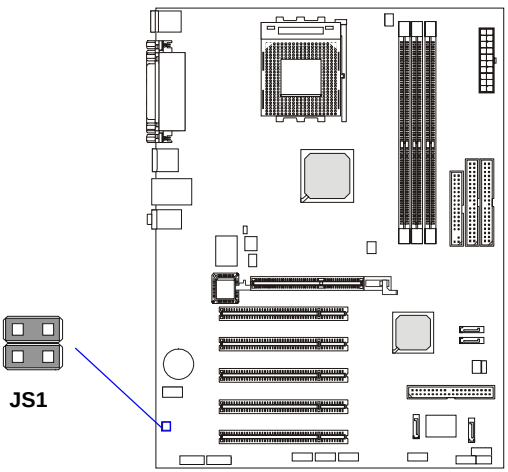
MSI Reminds You...

You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

Center/Subwoofer Speaker Setting Jumper: JS1

This jumper helps to configure the center and subwoofer audio signals. If you have the optional S-Bracket with your mainboard, be sure to remove the jumper, otherwise the 6-channel audio will not work probably. If you do not have S-Bracket, keep the jumper on to use the 6-channel audio.

For more information on the S-Bracket, please refer p.2-22 *S-Bracket (SPDIF) Connector: JSP1 (Optional)* and the *Appendix: Using 4- or 6-Channel Audio Function.*



Remove the jumper if your mainboard has the optional S-Bracket.

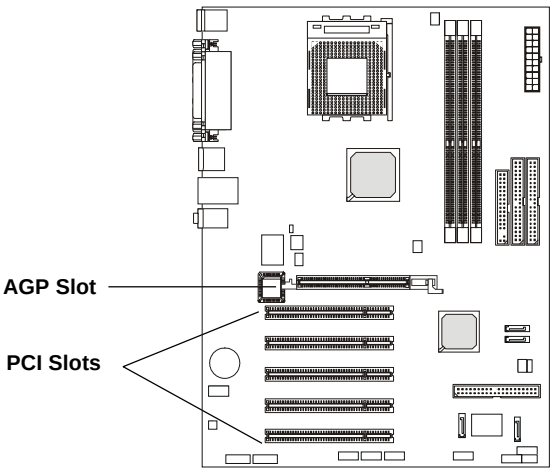
Factory default setting. Keep the jumper if your mainboard do not have the optional S-Bracket.

MSI Reminds You...

Be sure to shut down your computer before removing the JS1 jumper and installing the S-Bracket, or your mainboard may be damaged.

Slots

The motherboard provides one AGP slot and five 32-bit PCI bus slots.



AGP (Accelerated Graphics Port) Slot

The AGP slot allows you to insert the AGP graphics card. AGP is an interface specification designed for the throughput demands of 3D graphics. It introduces a 66MHz, 32-bit channel for the graphics controller to directly access main memory. The slot supports 4x (1.07Gbps) and 8x (2.1Gbps) AGP cards.

PCI (Peripheral Component Interconnect) Slots

The PCI slots allow you to insert the expansion cards to meet your needs. When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to make any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The PCI IRQ pins are typically connected to the PCI bus INT A# ~ INT D# pins as follows:

	Order 1	Order 2	Order 3	Order 4
PCI Slot 1	INT A#	INT B#	INT C#	INT D#
PCI Slot 2	INT B#	INT C#	INT D#	INT A#
PCI Slot 3	INT D#	INT A#	INT B#	INT C#
PCI Slot 4	INT C#	INT D#	INT A#	INT B#
PCI Slot 5	INT B#	INT C#	INT D#	INT A#

3

BIOS Setup

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use.

You may need to run the Setup program when:

◈ An error message appears on the screen during the system booting up, and requests you to run SETUP.

◈ You want to change the default settings for customized features.

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <DEL> key to enter Setup.

DEL:Setup F11:Boot Menu F12:Network boot TAB:Logo

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Selecting the First Boot Device

You are allowed to select the 1st boot device without entering the BIOS setup utility by pressing <F11>. When the same message as listed above appears on the screen, press <F11> to trigger the boot menu.

The POST messages might pass by too quickly for you to respond in time. If so, restart the system and press <F11> after around 2 or 3 seconds to activate the boot menu similar to the following.

Select First Boot Device		
Floppy	: 1st Floppy	
IDE-0	: IBM-DTLA-307038	
CDROM	: ATAPI CD-ROM DRIVE 40X M	
[Up/Dn] Select	[RETURN] Boot	[ESC] cancel

The boot menu will list all the bootable devices. Select the one you want to boot from by using arrow keys, and then press <Enter>. The system will boot from the selected device. The selection will not make changes to the settings in the BIOS setup utility, so next time when you power on the system, it will still use the original first boot device to boot up.

Control Keys

<↑>	Move to the previous item
<↓>	Move to the next item
<←>	Move to the item in the left hand
<→>	Move to the item in the right hand
<Enter>	Select the item
<Esc>	Jumps to the Exit menu or returns to the main menu from a submenu
<+/PU>	Increase the numeric value or make changes
<-/PD>	Decrease the numeric value or make changes
<F6>	Load High Performance Defaults
<F7>	Load Optimal Defaults
<F8>	BIOS Languages switch
<F10>	Save all the CMOS changes and exit

Getting Help

After entering the Setup utility, the first screen you see is the Main Menu.

Main Menu

The main menu displays the setup categories the BIOS supplies. You can use the arrow keys (↑↓) to select the item. The on-line description for the selected setup category is displayed at the bottom of the screen.

Default Settings

The BIOS setup program contains two kinds of default settings: the BIOS Setup and High Performance defaults. BIOS Setup defaults provide stable performance settings for all devices and the system, while High Performance defaults provide the best system performance but may affect the system stability.

The Main Menu

Once you enter AMIBIOS NEW SETUP UTILITY, the Main Menu will appear on the screen. The Main Menu displays twelve configurable functions and two exit choices. Use arrow keys to move among the items and press <Enter> to enter the sub-menu.

Standard CMOS Features
Use this menu for basic system configurations, such as time, date etc.

Advanced BIOS Features
Use this menu to setup the items of AMI® special enhanced features.

Advanced Chipset Features
Use this menu to change the values in the chipset registers and optimize your system's performance.

Power Management Features
Use this menu to specify your settings for power management.

PNP/PCI Configurations
This entry appears if your system supports PnP/PCI.

Integrated Peripherals
Use this menu to specify your settings for integrated peripherals.

PC Health Status
This entry shows your PC health status.

Frequency/Voltage Control
Use this menu to specify your settings for frequency/voltage control.

Set Supervisor Password
Use this menu to set Supervisor Password.

Set User Password
Use this menu to set User Password.

Load High Performance Defaults
Use this menu to load the BIOS values for the best system performance, but the system stability may be affected.

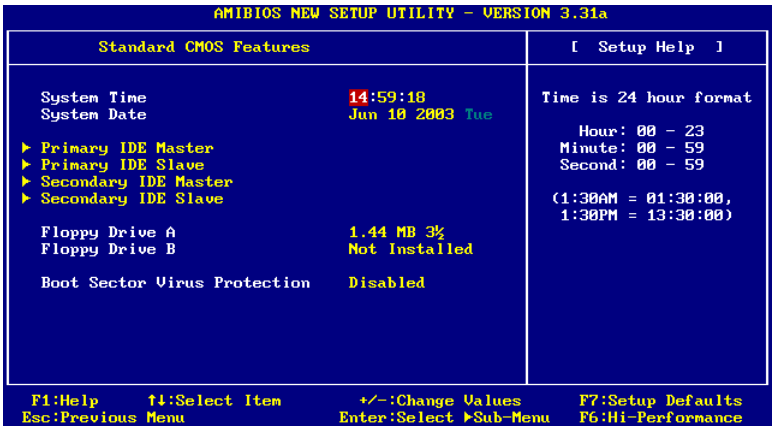
Load BIOS Setup Defaults
Use this menu to load factory default settings into the BIOS for stable system performance operations.

Save & Exit Setup
Save changes to CMOS and exit setup.

Exit Without Saving
Abandon all changes and exit setup.

Standard CMOS Features

The items inside STANDARD CMOS SETUP menu are divided into 9 categories. Each category includes none, one or more setup items. Use the arrow keys to highlight the item you want to modify and use the <PgUp> or <PgDn> keys to switch to the value you prefer.



System Time

This allows you to set the system time that you want (usually the current time). The time format is <hour> <minute> <second>.

System Date

This allows you to set the system to the date that you want (usually the current date). The format is <month> <date> <year> <day>.

month	The month from Jan. through Dec.
date	The date from 1 to 31 can be keyed by numeric function keys.
year	The year can be adjusted by users.
day	Day of the week, from Sun to Sat, determined by BIOS. Read-only.

Primary/Secondary IDE Master/Slave

Press PgUp/<+> or PgDn/<-> to select the hard disk drive type. The specification of hard disk drive will show up on the right hand according to your selection.

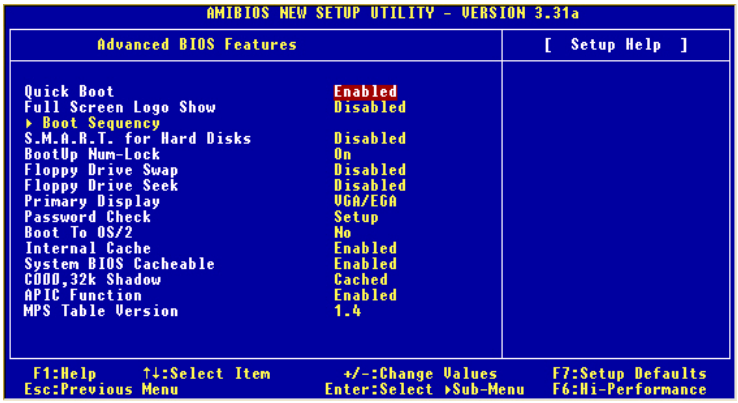
Type	Select how to define the HDD parameters
Cylinders	Enter cylinder number
Heads	Enter head number
Write Precompensation	Enter write precomp cylinder
Sectors	Enter sector number
Maximum Capacity	Read the maximal HDD capacity
LBA Mode	Select *Auto* for a hard disk > 512 MB under Windows and DOS, or *Disabled* under Netware and UNIX
Block Mode	Select *Auto* to enhance the hard disk performance
Fast Programmed I/O Modes	Select Auto to enhance hard disk performance by optimizing the hard disk timing
32 Bit Transfer Mode	Enable 32 bit to maximize the IDE hard disk data transfer rate

Floppy Drive A:/B:
This item allows you to set the type of floppy drives installed. Available options: *Not Installed, 1.2 MB 5¼, 720 KB 3½, 1.44 MB 3½* and *2.88 MB 3½*.

Boot Sector Virus Protection
The item is to set the Virus Warning feature for IDE Hard Disk boot sector protection. When *Enabled*, BIOS will issue a virus warning message and beep if a write to the boot sector or the partition table of the HDD is attempted. Setting options: *Disabled* and *Enabled*.

MSI Reminds You...
This feature only protects the boot sector, not the whole hard disk.

Advanced BIOS Features



Quick Boot

Setting the item to *Enabled* allows the system to boot within 5 seconds since it will skip some check items. Available options: *Enabled*, *Disabled*.

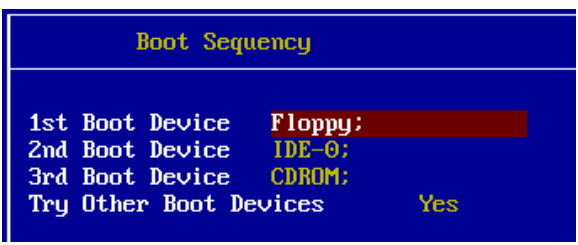
Full Screen Logo Show

This item enables you to show the company logo on the bootup screen. Settings are:

Enabled	Shows a still image (logo) on the full screen at boot.
Disabled	Shows the POST messages at boot.

Boot Sequence

Press <Enter> to enter the sub-menu screen.



1st/2nd/3rd Boot Device

The items allow you to set the sequence of boot devices where AMIBIOS attempts to load the operating system. The settings are:

IDE-0	The system will boot from the first HDD.
IDE-1	The system will boot from the second HDD.
IDE-2	The system will boot from the third HDD.
IDE-3	The system will boot from the fourth HDD.
Floppy	The system will boot from floppy drive.
ARMD-FDD	The system will boot from any ARMD device, such as LS-120 or ZIP drive, that functions as a floppy drive.
ARMD-HDD	The system will boot from ARMD device, such as MO or ZIP drive, that functions as hard disk drive.
CD/DVD	The system will boot from the CD/DVD ROM.
Legacy SCSI	The system will boot from the SCSI.
Legacy NETWO	The system will boot from the Network drive.
BBS-0	The system will boot from the first BBS (BIOS Boot Specification) compliant device.
BBS-1	The system will boot from the second BBS (BIOS Boot Specification) compliant device.
BBS-2	The system will boot from the third BBS (BIOS Boot Specification) compliant device.
BBS-3	The system will boot from the 4th BBS (BIOS Boot Specification) compliant device.
BBS-4	The system will boot from the 5th BBS (BIOS Boot Specification) compliant device.
BBS-5	The system will boot from the 6th BBS (BIOS Boot Specification) compliant device.
BBS-6	The system will boot from the 7th BBS (BIOS Boot Specification) compliant device.
BBS-7	The system will boot from the 8th BBS (BIOS Boot Specification) compliant device.
BBS-8	The system will boot from the 9th BBS (BIOS Boot Specification) compliant device.
BBS-9	The system will boot from the 10th BBS (BIOS Boot Specification) compliant device.
USB FDD	The system will boot from USB-interface floppy drive.
USB CDROM	The system will boot from the USB-interface CD-ROM.
USB HDD	The system will boot from the USB-interface HDD.

USB RMD-FDD The system will boot from any USB-interface ARMD device, such as LS-120 or ZIP drive, that functions as a floppy drive.

USB RMD-HDD The system will boot from USB-interface ARMD device, such as MO or ZIP drive, that functions as hard disk drive.

Disabled Disable this sequence.

MSI Reminds You...

Available settings for "1st/2nd/3rd Boot Device" vary depending on the bootable devices you have installed. For example, if you did not install a floppy drive, the setting "Floppy" does not show up.

Try Other Boot Devices

Setting the option to *Yes* allows the system to try to boot from other devices if the system fails to boot from the 1st/2nd/3rd boot device.

S.M.A.R.T. for Hard Disks

This allows you to activate the S.M.A.R.T. (Self-Monitoring Analysis & Reporting Technology) capability for the hard disks. S.M.A.R.T is a utility that monitors your disk status to predict hard disk failure. This gives you an opportunity to move data from a hard disk that is going to fail to a safe place before the hard disk becomes offline. Settings: *Enabled*, *Disabled*.

BootUp Num-Lock

This item is to set the Num Lock status when the system is powered on. Setting to *On* will turn on the Num Lock key when the system is powered on. Setting to *Off* will allow end users to use the arrow keys on the numeric keypad. Setting options: *On*, *Off*.

Floppy Drive Swap

Setting to *Enabled* will swap floppy drives A: and B:.

Floppy Drive Seek

This setting causes the BIOS to search for floppy disk drives at boot time. When enabled, the BIOS will activate the floppy disk drives during the boot process: the drive activity light will come on and the head will move back and forth once. First A: will be done and then B: if it exists. Setting options: *Disabled*, *Enabled*.

Primary Display
This configures the primary subsystem in the computer. Available options: *Mono (monochrome), CGA40x25, CGA80x25, VGA/EGA, Absent.*

Password Check
This specifies the type of AMIBIOS password protection that is implemented. Setting options are described below.

Option	Description
Setup	The password prompt appears only when end users try to run Setup.
Always	A password prompt appears every time when the computer is powered on or when end users try to run Setup.

Boot To OS/2
This allows you to run the OS/2® operating system with DRAM larger than 64MB. When you choose *No*, you cannot run the OS/2® operating system with DRAM larger than 64MB. But it is possible if you choose *Yes*.

Internal Cache
Cache memory is additional memory that is much faster than conventional DRAM (system memory). When the CPU requests data, the system transfers the requested data from the main DRAM into cache memory, for even faster access by the CPU. The setting controls the internal cache (also known as L1 or level 1 cache). Setting to *Enabled* will speed up the system performance.

System BIOS Cacheable
Selecting *Enabled* allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result. Setting options: *Enabled, Disabled.*

C000, 32k Shadow
This item specifies how the contents of the adapter ROM named in the item are handled. Settings are described below:

Option	Description
Disabled	The specified ROM is not copied to RAM.
Enabled	The contents of specified ROM are copied to RAM for faster system performance.
Cached	The contents of specified ROM are not only copied to RAM, the contents of the ROM area can be written to and read from cache memory.

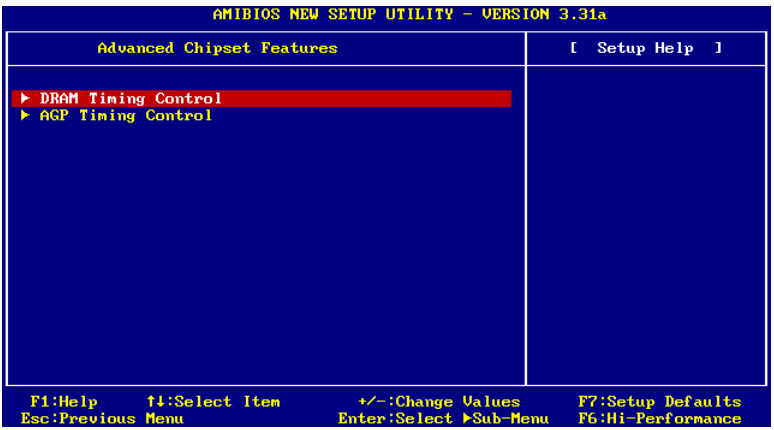
APIC Function

This field is used to enable or disable the APIC (Advanced Programmable Interrupt Controller). Due to compliance to PC2001 design guide, the system is able to run in APIC mode. Enabling APIC mode will expand available IRQs resources for the system. Settings: *Enabled*, *Disabled*.

MPS Table Version

This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, consult the vendor of your operating system. Settings: *1.4*, *1.1*.

Advanced Chipset Features

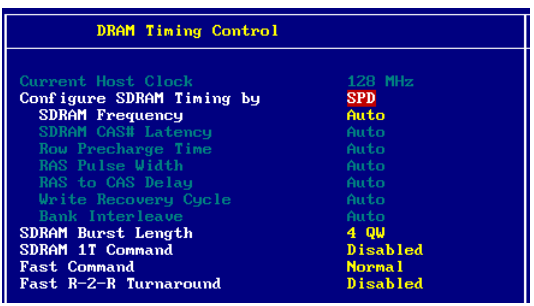


MSI Reminds You...

Change these settings only if you are familiar with the chipset.

DRAM Timing Control

Press <Enter> and the following sub-menu appears.



Current Host Clock

This item shows the current CPU frequency.

Configure SDRAM Timing by

Selects whether DRAM timing is controlled by the SPD (Serial Presence Detect) EEPROM on the DRAM module. Setting to *SPD* enables SDRAM

Frequency, SDRAM CAS# Latency, Row Precharge Time, RAS Pulse Width, RAS to CAS Delay and SDRAM Bank Interleave automatically to be determined by BIOS based on the configurations on the SPD. Selecting *User* allows users to configure these fields manually.

SDRAM Frequency
Use this item to configure the clock frequency of the installed SDRAM. Settings options: *200MHz, 266MHz, 333MHz, 400MHz, Auto*.

SDRAM CAS# Latency
This controls the timing delay (in clock cycles) before SDRAM starts a read command after receiving it. Settings: *Auto, 1.5, 2, 2.5, 3.0* (clocks). *2* (clocks) increases the system performance the most while *3* (clocks) provides the most stable performance.

Row Precharge Time
This item controls the number of cycles for Row Address Strobe (RAS) to be allowed to precharge. If insufficient time is allowed for the RAS to accumulate its charge before DRAM refresh, refreshing may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system. Available settings: *Auto, 2, 3, 4, 5*.

RAS Pulse Width
This setting allows you to select the number of clock cycles allotted for the RAS pulse width, according to DRAM specifications. The less the clock cycles, the faster the DRAM performance. Settings: *Auto, 6, 7, 8, 9*.

RAS to CAS Delay
When DRAM is refreshed, both rows and columns are addressed separately. This setup item allows you to determine the timing of the transition from RAS (row address strobe) to CAS (column address strobe). The less the clock cycles, the faster the DRAM performance. Setting options: *Auto, 2, 3, 4, 5*.

Write Recovery Cycle
You may set the write recovery cycle of DRAM. The less the clock cycles, the less time the DRAM recovery cycle writes. Setting options: *Auto, 1T, 2T*.

Bank Interleave
This field selects 2-bank or 4-bank interleave for the installed SDRAM. Disable the function if 16MB SDRAM is installed. Settings: *Disabled*, *2-Way* and *4-Way*.

SDRAM Burst Length
This setting allows you to set the size of Burst-Length for DRAM. Bursting feature is a technique that DRAM itself predicts the address of the next memory location to be accessed after the first address is accessed. To use the feature, you need to define the burst length, which is the actual length of burst plus the starting address and allows internal address counter to properly generate the next memory location. The bigger the size, the faster the DRAM performance. Settings: *4 QW, 8 QW.*

SDRAM 1T Command
This setting controls the SDRAM command rate. Selecting *Enabled* allows SDRAM signal controller to run at 1T (T=clock cycles) rate. Selecting *Disabled* makes SDRAM signal controller run at 2T rate. *1T* is faster than *2T*. Setting options: *Disabled, Enabled.*

Fast Command
This item controls the internal timing of CPU. Selecting *Ultra* allows CPU to handle data/instructions at the fastest speed. *Fast* enables CPU to handle at a faster speed, while *Normal* let CPU handle them at the slowest rate.

Fast R-2-R Turnaround
Burst read operation can be interrupted by new read of any bank. Random column access is allowed. READ to READ interval is minimum 1 CLK. Selecting *Enabled* to shorten the turnaround interval to improve the performance. Setting options: *Disabled, Enabled.*

AGP Timing Control
Press <Enter> and the following sub-menu appears.

AGPMode
The item sets an appropriate mode for the installed AGP card. Setting options: *1x, 2x, 4x, Auto*. Select *4x* only if your AGP card supports it.

AGP Fast Write
This option enables or disables the AGP Fast Write feature. The Fast Write technology allows the CPU to write directly to the graphics card without passing anything through the system memory and improves the AGP 4X speed. Select *Enabled* only when the installed AGP card supports this function. Settings: *Enabled, Disabled*.

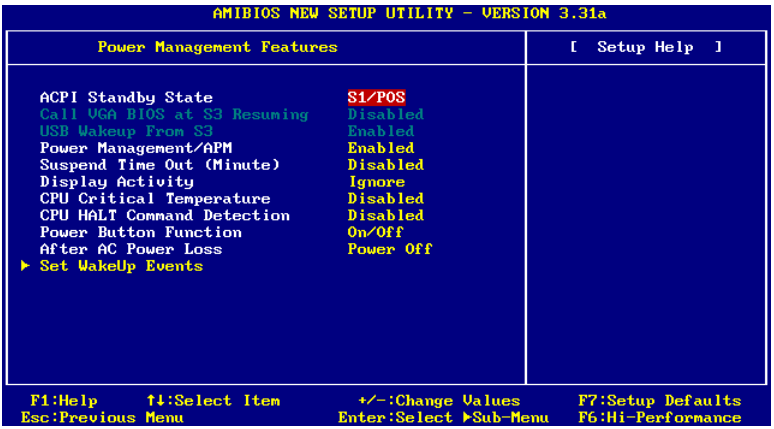
AGP Aperture Size
This setting controls just how much system RAM can be allocated to AGP for video purposes. The aperture is a portion of the PCI memory address range dedicated to graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. The option allows the selection of an aperture size of *4MB, 8MB, 16MB, 32MB, 64MB, 128MB,* and *256 MB.*

AGP Master 1 W/S Write
The field allows users to insert one wait state into the AGP write cycle. Settings: *Enabled, Disabled.*

AGP Master 1 W/S Read
The field allows users to insert one wait state into the AGP read cycle. Settings: *Enabled, Disabled.*

AGP Read Synchronization
The field allows you to enable or disable the AGP Read Synchronization feature. Settings: *Enabled, Disabled*.

Power Management Features



MSI Reminds You...

S3-related functions described in this section are available only when your BIOS supports S3 sleep mode.

ACPI Standby State

This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, such as Windows 98SE, Windows ME and Windows 2000, you can choose to enter the Standby mode in S1(POS) or S3(STR) fashion through the setting of this field. Options are:

S1/POS The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.

S3/STR The S3 sleep mode is a lower power state where the information of system configuration and open applications/ files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.

Auto BIOS determines the best ode automatically.

Call VGA BIOS at S3 Resuming

Selecting *Enabled* allows BIOS to call VGA BIOS to initialize the VGA card when system wakes up (resumes) from S3 sleep state. The system resume time is shortened when you disable the function, but system will need an AGP

driver to initialize the VGA card. Therefore, if the AGP driver of the card does not support the initialization feature, the display may work abnormally or not function after resuming from S3.

USB Wakeup From S3
This item allows the activity of the USB device to wake up the system from S3 (Suspend to RAM) sleep state. Settings: *Enabled, Disabled.*

Power Management/APM
Setting to *Enabled* will activate an Advanced Power Management (APM) device to enhance Max Saving mode and stop CPU internal clock. Settings: *Disabled, Enabled.*

Suspend Time Out (Minute)
After the selected period of system inactivity, all devices except the CPU shut off. Settings: *Disabled, 1, 2, 4, 8, 10, 20, 30, 40, 50, 60.*

Display Activity
These items specify if the BIOS will monitor the activity of the specified hardware peripheral or component. If set to *Monitor*, any activity detected on the specified hardware peripheral or component will wake up the system or prevent the system from entering the power saving modes. Settings: *Monitor, Ignore.*

CPU Critical Temperature
If the CPU temperature reaches the upper limit preset in this setting, the warning mechanism will be activated. This helps you to prevent the CPU overheating problem.

CPU HALT Command Detection
This item allows your OS to determine whether the CPU will enter the HALT command state. Options: *Enabled, Disabled.*

Power Button Function
This feature sets the function of the power button. Settings are:

On/Off	The power button functions as normal power off button.
Suspend	When you press the power button, the computer enters the suspend/sleep mode, but if the button is pressed for more than four seconds, the computer is turned off.

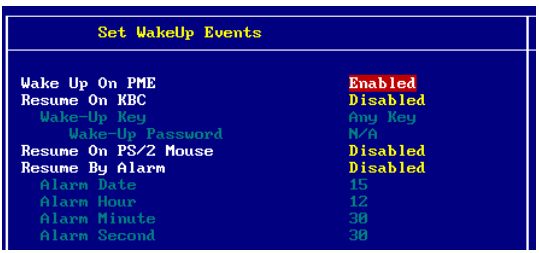
After AC Power Loss
This setting specifies whether your system will reboot after a power failure or

interrupt occurs. Available settings are:

Power Off	Leaves the computer in the power off state.
Power On	Reboots the computer.
Last State	Restores the system to the previous status before power failure or interrupt occurred.

Set WakeUp Events

Press <Enter> and the following sub-menu appears.



Wake Up On PME, Resume On KBC (with "Wake-Up Key" and "Wake-Up Password"), Resume On PS/2 Mouse

These fields specify whether the system will be awakened from power saving modes when activity or input signal of the specified hardware peripheral or component is detected. Settings: *Enabled, Disabled.*

MSI Reminds You...

For "Wake-Up Key" function, the option "Specific Key" refers to the password you specify in the "Wake-Up Password" field. Once you set up a password, it will disable "Resume on PS/2 Mouse".

Resume By Alarm

This is used to enable or disable the feature of booting up the system on a scheduled time/date from the soft off (S5) state. Settings: *Enabled, Disabled.*

Alarm Date/Hour/Minute/Second

If *Resume By Alarm* is set to *Enabled*, the system will automatically resume (boot up) on a specific date/hour/minute/second specified in these fields. Available settings for each item are:

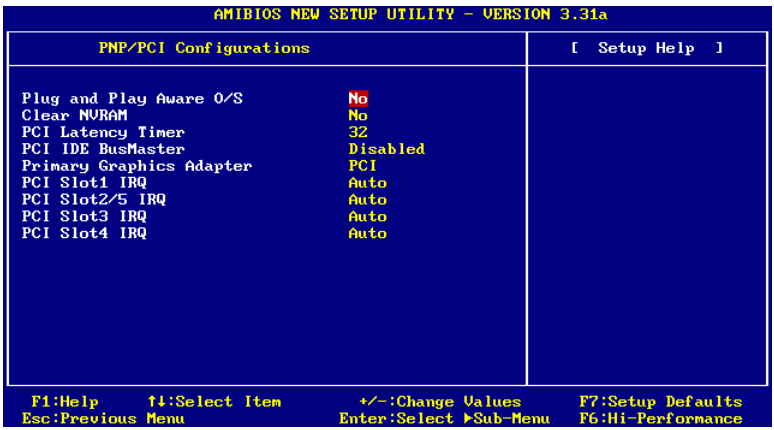
Alarm Date	*01 ~ 31, Every Day*
Alarm Hour	*00 ~ 23*
Alarm Minute	*00 ~ 59*
Alarm Second	*00 ~ 59*

MSI Reminds You...

If you have changed this setting, you must let the system boot up until it enters the operating system, before this function will work.

PNP/PCI Configurations

This section describes configuring the PCI bus system and PnP (Plug & Play) feature. PCI, or **P**eripheral **C**omponent **I**nterconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.



Plug and Play Aware O/S

When set to *Yes*, BIOS will only initialize the PnP cards used for booting (VGA, IDE, SCSI). The rest of the cards will be initialized by the PnP operating system like Windows® 98, 2000 or ME. When set to *No*, BIOS will initialize all the PnP cards. Select *Yes* if the operating system is Plug & Play.

Clear NVRAM

The ESCD (Extended System Configuration Data) NVRAM (Non-volatile Random Access Memory) is where the BIOS stores resource information for both PNP and non-PNP devices in a bit string format. When the item is set to *Yes*, the system will reset ESCD NVRAM right after the system is booted up and then set the setting of the item back to *No* automatically.

PCI Latency Timer

This item controls how long each PCI device can hold the bus before another takes over. When set to higher values, every PCI device can conduct transactions for a longer time and thus improve the effective PCI bandwidth.

For better PCI performance, you should set the item to higher values. Settings range from *32* to *248* at a 32 increment.

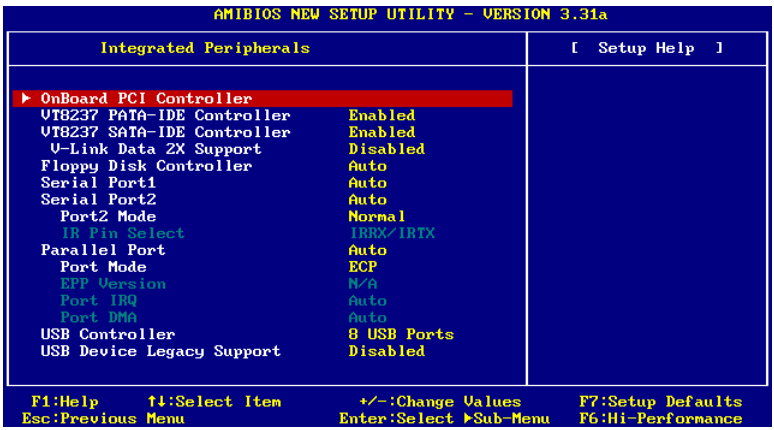
PCI IDE BusMaster
Set this option to *Enabled* to specify that the IDE controller on the PCI local bus has bus mastering capability. Settings options: *Disabled*, *Enabled*.

Primary Graphics Adaptor
This setting specifies which VGA card is your primary graphics adapter. Setting options are:

AGP	The system initializes the installed AGP card first. If the AGP card is not available, it will initialize the PCI VGA card.
PCI	The system initializes the installed PCI VGA card first. If the PCI VGA card is not available, it will initialize the AGP card.

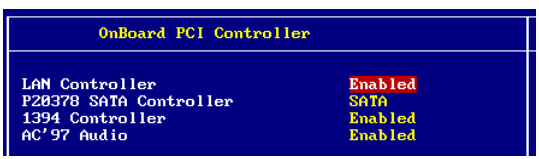
PCI Slot1 IRQ, PCI Slot2/5 IRQ, PCI Slot3 IRQ, PCI Slot4 IRQ
These items specify the IRQ line for each PCI slot. Setting options: *3*, *4*, *5*, *7*, *9*, *10*, *11*, *Auto*. Selecting *Auto* allows BIOS to automatically determine the IRQ line for each PCI slot.

Integrated Peripherals



OnBoard PCI Controller

This is used to enable or disable the onboard PCI controller. ***Please note that the options showed on your BIOS might be different depending on the motherboard you buy.***



LAN Controller, P20378 SATA Controller, 1394 Controller, AC'97 Audio

Set these options to *Enabled* (*SATA* or *RAID* for "P20378 SATA Controller") to enable the controllers of these 4 PCI devices.

VT8237 PATA-IDE Controller

This setting is used to enable/disabled the VT8237 PATA-IDE controller. Setting options: *Enabled, Disabled.*

VT8237 SATA-IDE Controller

This setting is used to enable/disabled the VT8237 SATA-IDE controller. Setting options: *Disabled, Enabled.*

V-Link Data 2X Support
This setting controls the onboard V-Link Data 2X Support. Setting options: *Enabled, Disabled.*

Floopy Disk Controller
This is used to enable or disable the onboard Floppy controller.

Option	Description
Auto	BIOS will automatically determine whether to enable the onboard Floppy controller or not.
Enabled	Enables the onboard Floppy controller.
Disabled	Disables the onboard Floppy controller.

Serial Port 1/2
These items specify the base I/O port addresses of the onboard Serial Port 1 (COM A)/Serial Port 2 (COM B). Selecting *Auto* allows AMIBIOS to automatically determine the correct base I/O port address. Settings: *Auto, 3F8/COM1, 2F8/COM2, 3E8/COM3, 2E8/COM4* and *Disabled.*

Port2 Mode
This item sets the operation mode for Serial Port 2. Settings: *Normal, 1.6 uS, 3/16 Baud* and *ASKIR* (the last three operation modes are setting options for IR function).

IR Pin Select
Set to *IRRX/IRTX* when using an internal IR module connected to the IR header. Set to *SINB/SOUTB.* when connecting an IR adapter to COM B.

Parallel Port
This field specifies the base I/O port address of the onboard parallel port. Selecting *Auto* allows AMIBIOS to automatically determine the correct base I/O port address. Settings: *Auto, 378, 278, 3BC, Disabled.*

Port Mode
This item selects the operation mode for the onboard parallel port: *ECP, Normal, Bi-Dir* or *EPP*.

EPP Version
The item selects the EPP version used by the parallel port if the port is set to *EPP* mode. Settings: *1.7, 1.9*.

Port IRQ
When *OnBoard Parallel Port* is set to *Auto*, the item shows *Auto* indicating that BIOS determines the IRQ for the parallel port automatically.

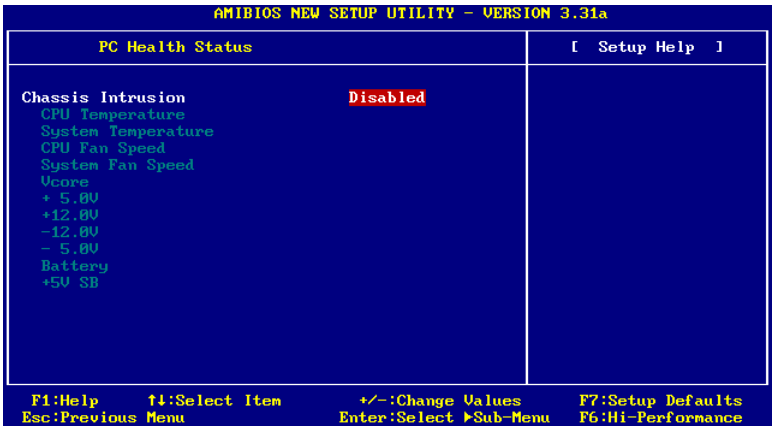
Port DMA
This feature needs to be configured only when *Parallel Port Mode* is set to the *ECP* mode. When Parallel Port is set to *Auto*, the field will show *Auto* indicating that BIOS automatically determines the DMA channel for the parallel port.

USB Controller
This setting is used to enable/disable the onboard USB ports. Setting options: *Disabled, 2 USB Ports, 4 USB Ports, 6 USB Ports.*

USB Device Legacy Support
Set to *All Device* if you need to use any USB device in the operating system that does not support or have any USB driver installed, such as DOS and SCO Unix. Set to *No Mice* only if you want to use any USB device other than the USB mouse.

PC Health Status

This section shows the status of your CPU, fan, overall system status, etc. Monitor function is available only if there is hardware monitoring mechanism onboard.



Chassis Intrusion

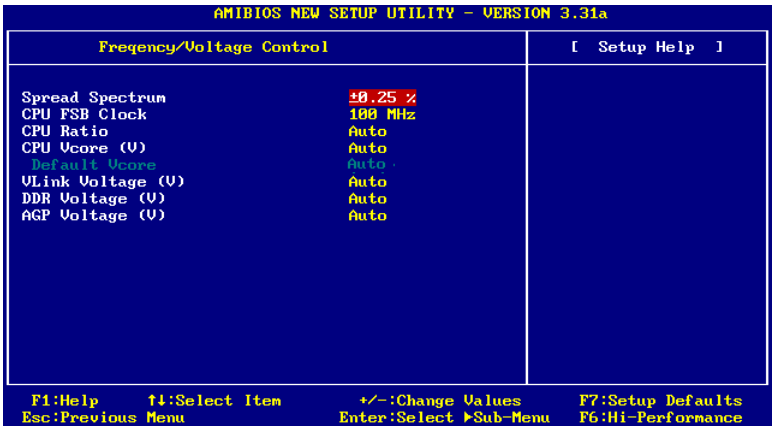
The field enables or disables the feature of recording the chassis intrusion status and issuing a warning message if the chassis is once opened. To clear the warning message, set the field to *Reset*. The setting of the field will automatically return to *Enabled* later. Settings: *Enabled*, *Reset*, *Disabled*.

CPU/System Temperature, CPU/System Fan Speed, Vcore, +5.0V, +12.0V, -12.0V, -5.0V, Battery, +5V SB

These items display the current status of all of the monitored hardware devices/ components such as CPU voltages, temperatures and all fans' speeds.

Frequency/Voltage Control

Use this menu to specify your settings for frequency/voltage control.



Spread Spectrum

When the motherboard's clock generator pulses, the extreme values (spikes) of the pulses creates EMI (Electromagnetic Interference). The Spread Spectrum function reduces the EMI generated by modulating the pulses so that the spikes of the pulses are reduced to flatter curves. If you do not have any EMI problem, leave the setting at *Disabled* for optimal system stability and performance. But if you are plagued by EMI, select *one of the options* for EMI reduction. Remember to disable Spread Spectrum if you are overclocking because even a slight jitter can introduce a temporary boost in clock speed which may just cause your overclocked processor to lock up. Available options: *+/-0.25%, +/-0.5%, +/-0.75%, Disabled.*

CPU FSB Clock

This item allows you to select the CPU Front Side Bus clock frequency (in MHz) and overclock the processor by adjusting the FSB clock to a higher frequency. Select the number between *100~280* for needed frequency.

CPU Ratio/Vcore (V)

The settings are used to adjust the CPU clock multiplier (ratio) and CPU corevoltage (Vcore). These settings offer users a tool to overclock the system.

MSI Reminds You...
Changing CPU Ratio/Vcore could result in the instability of the system; therefore, it is NOT recommended to change the default setting for long-term usage.

Default Vcore
It shows the default Vcore of the CPU, which is read-only.

VLink Voltage (V)
Adjusting the VLink voltage can increase the VLink voltage for the possible overclocking. Setting options: *Auto, 2.60, 2.70, 2.80.*

DDR Voltage (V)
Adjusting the DDR voltage can increase the DDR speed. Any changes made to this setting may cause a stability issue, so ***changing the DDR voltage for long-term purpose is NOT recommended***. Setting options: *Auto, 2.55, 2.60, 2.65, 2.70, 2.75, 2.80, 2.85, 2.90, 2.95, 3.00, 3.05, 3.10, 3.20, 3.25, 3.30.*

AGP Voltage (V)
AGP voltage is adjustable in the field, allowing you to increase the performance of your AGP display card when overclocking, but the stability may be affected. Setting options: *Auto, 1.55* to *2.10* at *0.05* increment.

MSI Reminds You...
*The settings shown in different color in **CPU Vcore (V), VLink Voltage (V), DDR Voltage (V)*** and ***AGP Voltage (V)*** *helps to verify if your setting is proper for your system.*
White: Safe setting.
Yellow: High performance setting.
Red: Not recommended setting and the system may be unstable.

Set Supervisor/User Password

When you select this function, a message as below will appear on the screen:

Type the password, up to six characters in length, and press <Enter>. The password typed now will replace any previously set password from CMOS memory. You will be prompted to confirm the password. Retype the password and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To clear a set password, just press <Enter> when you are prompted to enter the password. A message will show up confirming the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup without entering any password.

When a password has been set, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also have AMIBIOS to request a password each time the system is booted. This would prevent unauthorized use of your computer. The setting to determine when the password prompt is required is the PASSWORD CHECK option of the ADVANCED BIOS FEATURES menu. If the PASSWORD CHECK option is set to *Always*, the password is required both at boot and at entry to Setup. If set to *Setup*, password prompt only occurs when you try to enter Setup.

MSI Reminds You...

About Supervisor Password & User Password:

Supervisor password:	*Can enter and change the settings of the setup menu.*
User password:	*Can only enter but do not have the right to change the settings of the setup menu.*

Load High Performance/BIOS Setup Defaults

The two options on the main menu allow users to restore all of the BIOS settings to High Performance defaults or BIOS Setup defaults. The High Performance Defaults are the values set by the mainboard manufacturer for the best system performance but probably will cause a stability issue. The BIOS Setup Defaults are the default values also set by the mainboard manufacturer for stable performance of the mainboard.

When you select Load High Performance Defaults, a message as below appears:

Pressing 'Enter' loads the default BIOS values that enable the best system performance but may lead to a stability issue.

MSI Reminds You...

The option is for power or overclocking users only*. Use of high performance defaults will tighten most timings to increase the system performance. Therefore, a high-end system configuration is a must, which means you need high-quality VGA adapter, RAM and so on.* ***We don't recommend that users should apply the high performance defaults in their regular systems.*** *Otherwise, the system may become unstable or even crash. If the system crashes or hangs after enabling the feature, please CLEAR CMOS DATA to resolve the problem. For more information, refer to "Clear CMOS Jumper:JBAT1" in Chapter 2.*

When you select Load BIOS Setup Defaults, a message as below appears:

Pressing 'Enter' loads the default values that are factory settings for stable system performance.

Appendix: Using 2-, 4- or 6-Channel Audio Function

The motherboard comes with C-Media 9739A AC'97 audio chip, which provides exclusive Xear 3D™ technology, a value-add PC audio total solution. In addition, C-Media designs a Universal Driver Architecture (UDA driver) which has a flexible interface so that it can be applied to different platforms and all C-Media audio chips. C-Media 9739A allows the board to attach 4 or 6 speakers for better surround sound effect. The section will tell you how to install and use 2-/4-/6-channel audio function on the board.

Installing C-Media Drivers

The mainboard is able to transform the audio connectors on the back panel from 2-channel to 4-/6-channel. To use the function, you need to install the C-Media UDA driver.

The UDA driver supports all Windows, C-Media AC'97 CODEC, and audio controllers (south bridges) on board. Moreover, there is no operation barrier when switching to other C-Media's products.

Main Features of UDA Driver V.029:

1. ***Xear 3D - 5.1 Virtual SPEAKER SHIFTER***:

   ➤ It allows users to enjoy multi-channel surround sound system with any kind of appliances including earphone (we call it **5.1 Xearphone** feature), 2, 2.1 to 5.1 speakers.

   ➤ It has an user-friendly interface to shifting virtual speakers just like moving the physical speakers literally to break through any spatial placement limitation.

   ➤ Users can adjust the best field dynamically adapted to different appliances and sound sources.

   ➤ A new multi-channel listening mode is provided: Earphone plus. You can use open-aired earphones in place of rear speakers to save the cost and setup trouble of rear speakers.

2. ***HRTF 3D Positional Audio*** : Xear 3D integrated world-standard Sensaura's CRL3D™ engine for providing the best **HRTF (Head-Related Transfer Function) 3D positional audio** and related features as follows. They are necessary for gaming and interactive applications:

   ➤ **EAX™ 1.0 & 2.0** (Creative Environment Audio eXtension has been a world-wide standard for high-quality games.)

   ➤ **A3D™ 1.0**

   ➤ **Compatible with Microsoft DirectSound 3D™ H/W & S/W**

3. ***Sound Effects - Environment***: It provides 27 options for simulating the listening environment and get more magic and different sound field.
4. ***Sound Effects - Environment Size***: It provides Small, Medium and Large space for every type of Environment.
5. ***Sound Effects - Equalizer***: It offers 10-band Equalizer and 12 pre-set models like "Live", "Jazz" and so on for users to modify the frequency response of sound signals. There is also "User Defined" list for users to save their own

settings.

6. ***Demo Program - Play3D Demo***: It provides 5 sound sources and moving path for playing for 3D audio playing. You can feel 3D positional sound and also use this program to adjust your virtual speakers before playing 3D audio applications like gaming.
7. ***Demo Program - Multi-channel Music***: Multi-channel Music Demo Program has three 5.1-channel melodies for playing. You can also click on the speakers respectively to test each channel and adjust virtual speakers before playing multi-channel audio applications like DVD.

To install C-Media drivers:

1. Insert the companion CD into the CD-ROM drive. The setup screen will automatically appear.
2. Click on **C-Media Sound Drivers**.
3. Follow the on-screen instructions to complete installation.
4. Restart the system.

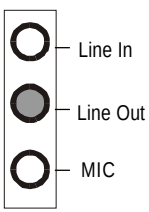
Hardware Configuration

After installing the audio driver, you are able to use the 4-/6-channel audio feature now. To enable 4- or 6-channel audio operation, first connect 4 or 6 speakers to the appropriate audio connectors, and then select 4- or 6-channel audio setting in the software utility.

There are two ways to utilize the function and connect the speakers to your computer:

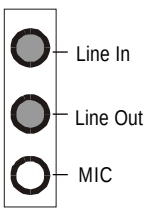
- *Use the optional S-Bracket.* If your motherboard supports S-Bracket and you have installed S-Bracket in the computer, you can connect two speakers to back panel's Line-Out connector, and the rest of speakers to S-Bracket.
- *Use the back panel only (without S-Bracket).* If you do not have a S-Bracket, you can connect all speakers to the audio connectors on the back panel.

After installing the C-Media drivers, you can attach the speakers for 4-/6-channel audio output. Always connect the speakers to the LINE OUT connectors. Different connector configurations for 2-/4-/6-channel operations are listed below:



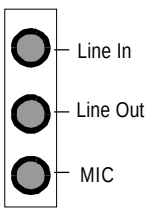
2-Channel

In 2-channel configuration, Line Out, Line In and MIC functions all exist.



4-Channel

When set to 4-channel configuration, LINE IN function DOES NOT WORK any more.



6-Channel

When set to 6-channel configuration, LINE IN and MIC functions DO NOT WORK anymore.

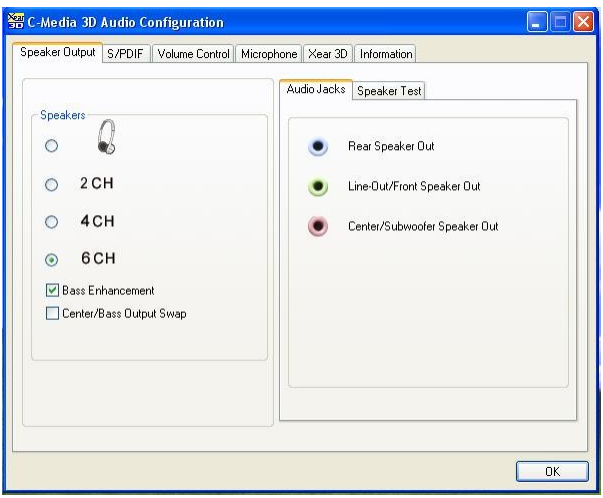
Software Configuration

To have 4-/6-channel audio work, you must set appropriate configuration in the C-Media software application. Click the C-Media Mixer icon from the window tray on the bottom, and choose **Open**.

Then the "C-Media 3D Audio Configuration" will appear . Click on the **Speaker Output** tab to configure the audio.

Speaker Output

1. Without the optional S-Bracket:

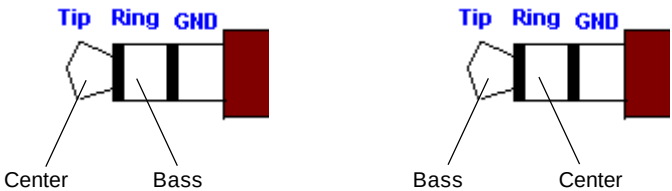


➤ **Bass Enhancement:** You may enable the **Bass Enhancement** option to enhance the bass signal effect, in particular for Earphone Plus Mode. It is available in 4 & 6CH setting.

In 4CH setting: Real channel => Front channel

In 6CH setting: Front and Rear channel => Independent Bass/Subwoofer channel

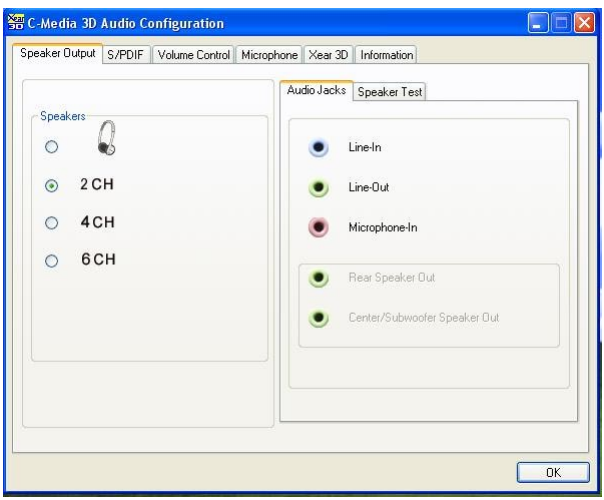
➤ **Center/Bass Output Swap:** Enabling this option will exchange the center/ bass output channel. PC speaker manufactures define typically that the center signal is delivered by tip of the stereo plug and the bass signal is by ring of it, as the figure showed below. However, some speakers have opposite definition. Please use this option to solve the possible trouble.



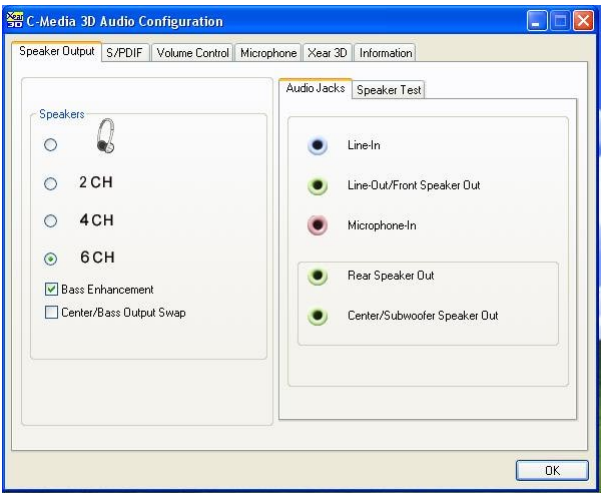
In the left side, check the radio button next to the speaker to fit your audio devices. In the **Audio Jacks** tab in the right side, the audio will function as it shows. Please confirm you have connected your hardware to correct jacks before using.

2. With the optional S-Bracket:

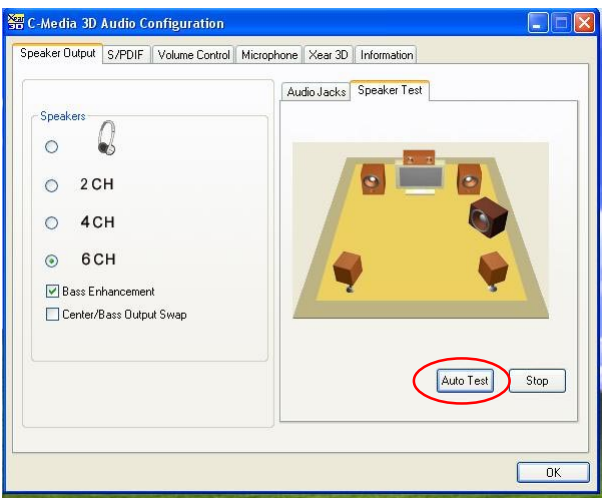
Attach the optional S-bracket and the audio output will function as the screen showed.



When you choose **6CH**, the audio output will function as the screen showed below.

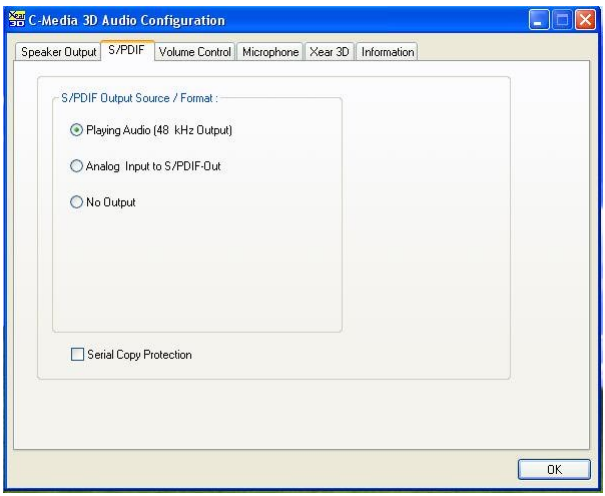


Check the **Speaker Test** tab in the right side. It shows the speaker figure and test environment complying with your speaker type settings as follows. You can click **Auto Test** button or just click each speaker for testing your audio connection. The sound will repeat unless you click **Stop**.



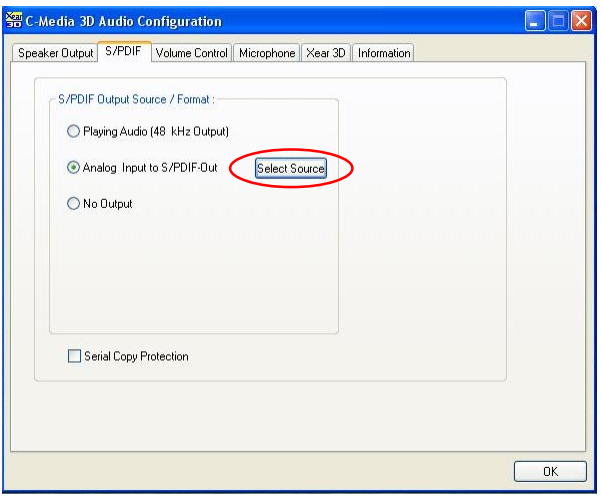
S/PDIF

Click on the **S/PDIF** tab and the following screen appears.



- **Playing Audio (48 kHz Output)**: Playing Digital Audio to Digital S/PDIF Output. Choosing this option allows the output digital playing audio from your computer like DVD, VCD, digital CD, MP3, Wave... etc through S/PDIF in 48KHz sample rate.
- **Analog Input to S/PDIF-Out**: Convert Analog Input to Digital S/PDIF Out. This function is to convert analog input audio like Line-in, CD-in, Microphone-in signal to S/PDIF digital output in real time. This is useful to transfer the analog audio from one device to the S/PDIF interface of another such as the external decoder or the amplifier of Home Theatre.
- **No Output:** C-Media AC'97 CODECs supports S/PDIF output with analog output at the same time. When choosing this option, S/PDIF output signal will be terminated. Otherwise, it would be transmitted all the time.
- **Serial Copy Protection Option:** When this option is enabled, the copyright of S/PDIF output audio data will be asserted. Therefore it can be only recorded once but can't be copied again according to SCMS (Serial Copy Management System) mandated by Audio Home Recording Act of U.S. in 1992.

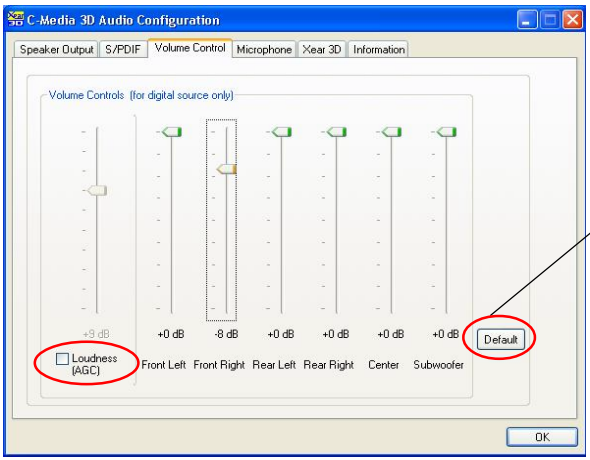
Choose the **Analog Input to S/PDIF-Out** and then click the **Select Source** button. Then the **Select Source** window appears.



➤ **Select Source**: Since the analog input signal needs to be recorded and converted to digital format, you have to click **Select Source** button and select one analog source in the "Select Source" window. Actually the selected item synchronizes with the recording panel of Microsoft.

Volume Control

Click on the **Volume Control** tab and the following screen appears.



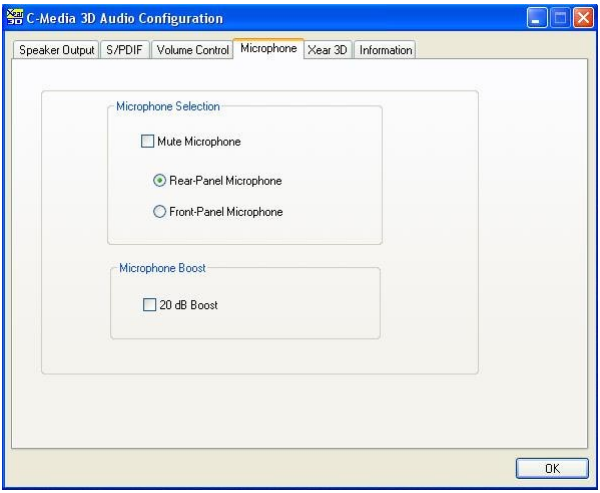
You may regulate each volume to the speaker for current playing digital sound sources. If you use 2-channel speaker, only Front Left and Front Right bars are available for you to configure. If you use 4-channel speaker, only Front Left, Front Right, Rear Left and Rear Right bars are available. In 6-channel mode, you may adjust all the speakers as showed above.

➤ **Loudness (AGC): Loudness w/Auto-Gain-Control:** When you want a higher volume level of digital audio, you can enable **Loudness (AGC)**. It provides extra +3dB to +12dB gain to all channels. The driver has also been designed with a sophisticated auto gain control minimizing the signal clipping distortion. However, it is not recommended to enhance the volume too much here if you want a best sound quality. The best way is to increase the volume of external speakers or just to increase the Master Volume in Microsoft Volume Control.

Left-click Microsoft “Volume Control” icon once and you’ll get the Master Volume control slider.

Microphone

Click on the **Microphone** tab and the following screen appears.

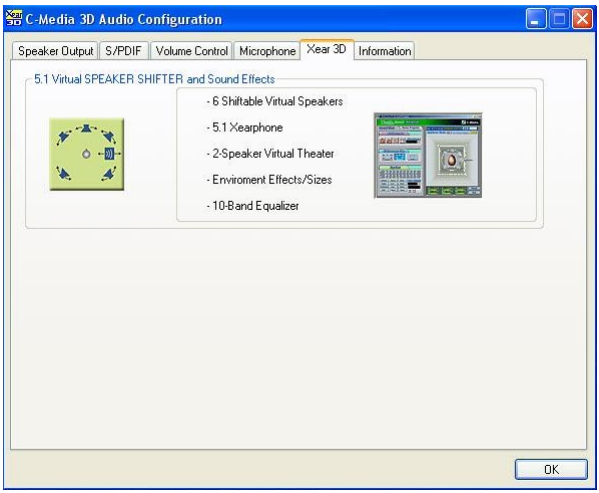


- **Mute Microphone:** Check this item to disable microphone inputs.
- **Microphone Selection:** You may select the microphone input you are going to use. But if your system does not support 2 microphone inputs, then you won't see two items.
  The real-panel microphone jack is sometimes shared by center/subwoofer output and will be grayed as below: when you set 6CH speaker output. At this moment, you can still use front-panel microphone.

- **Microphone Boost:** Check this them to enhance microphone volume by +20dB.

Xear 3D

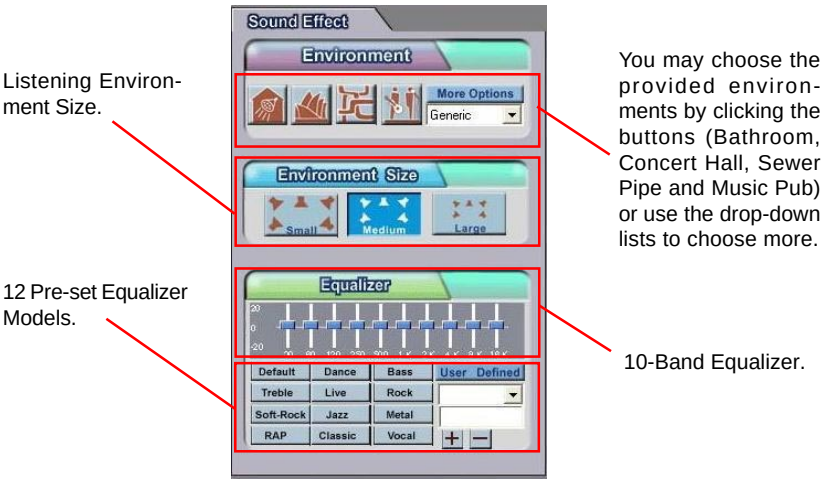
Click on the **Xear 3D** tab and the following screen appears.



C-Media UDA driver now supports **Xear 3D-5.1 Virtual SPEAKER SHIRFTER** and sound effects. Just click the left button in Xear 3D tab and the new friendly/fancy graphic user interface will pop up as follows.

1. Sound Effect

From this part, you may choose the sound effect you like from 27 environment effects, 3 environment sizes and 10-band pre-set equalizer.



2. Demo Program

This part contains multi-channel music (including speakers testing) demo program.

3 pieces of 5.1-channel music for your selection.

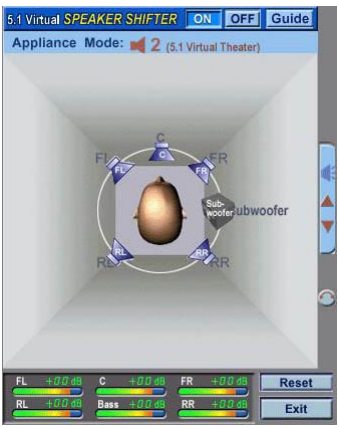
5.1-channel speaker environment.

You may click each speaker to get one channel sound. If it has sound, it will be lighted up. You may also click each speaker to test your connection/ configuration. Moreover, it can help you to adjust your virtual speakers for multi-channel audio applications, like DVD.

3. Xear 3D-5.1 Virtual SPEAKER SHIFTER

This part provides an advanced, amazing and considerate feature-dynamically adjustable multi-channel sound system no matter what listening appliance you are using and what application you are running.

The default setting for SPEAKER SHIFTER is OFF, thus you have to click on it to make it ON, in which all the speakers are available to adjust.

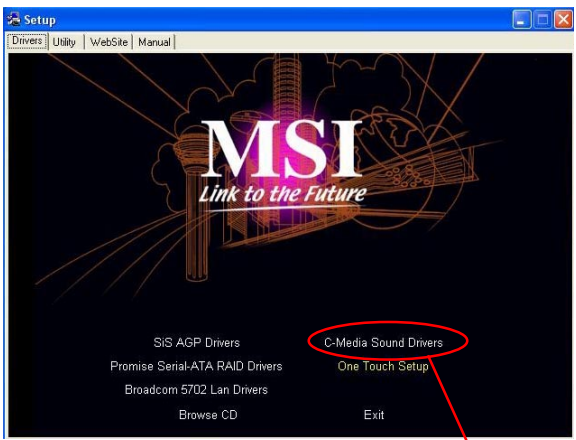


You may move Front-Left, Front-Right, Rear-Left, Rear-Right virtual speakers to anywhere. Center is usually for Voice in DVD and just suitable to move in vertical to keep the sound in the center. Subwoofer signal is directionless low-frequency sound to human ears. Thus, please move it horizontally to express strength or weakness.

Xear 3D- Play3D Demo

Xear 3D Advanced Program also provides interesting Play3D demo programs for helping you configure your audio environment.

If you click **One Touch Setup** during the setup procedure when you insert the MSI software driver, you may only see the **Sound Effect** tab in the Xear 3D Advanced Program. **Demo Program** will not be installed automatically. Please click **C-Media Sound Drivers** again for the complete installation of C-Media applications. *Please note the Setup screen may be different as showed as following depending on the mainboard you purchase.*



Click here for the complete installation of C-Media applications.

After installing the program, you will find the program from the path: Start-> Programs->C-Media 3D Audio->Play3D Demo Program.

The Xear3D Sound - Play3D Demo program is showed as follows:

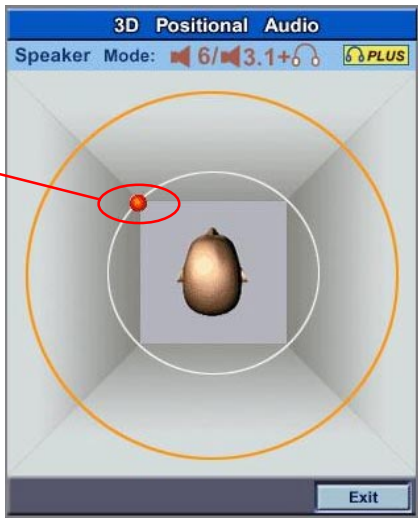
Five built-in Sound Sources.

Six Environment Effects, which will synchronize with the Environment setting on "Sound Effect" part.

Five Moving Paths.

In the **Moving Path** selection, you may adjust your virtual speakers before playing 3D audio applications like gaming. When clicking each of the **Moving Path** icons (Drag Path, Horizontal Circle, Vertical Circle, Z Path and Random Curve), a rea moving ball indicates the 3D source position. The **Drag Path** is recommended because it's the most flexible one.

3D Sound Source position indicator.



Using 2-, 4- or 6-Channel Audio Function

Attaching Speakers

To perform multichannel audio operation, connect multiple speakers to the system. You should connect the same number of speakers as the audio channels you will select in the software utility.

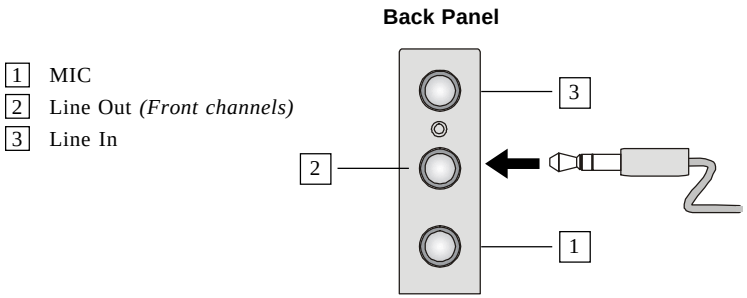
Using S-BRACKET connectors:

S-Bracket is an optional accessory. It gives access to analog and digital audio output by integrating both SPDIF (Sony & Philips Digital Interface) and analog LINE OUT connectors. To use the S-Bracket, you should select correct setting in the software utility. For information about the setting, refer to *Selecting 2-, 4- or 6-Channel Setting* later in the section.

Connector configurations for 2-, 4- and 6-channel using S-Bracket are described below:

2-Channel Analog Audio Output

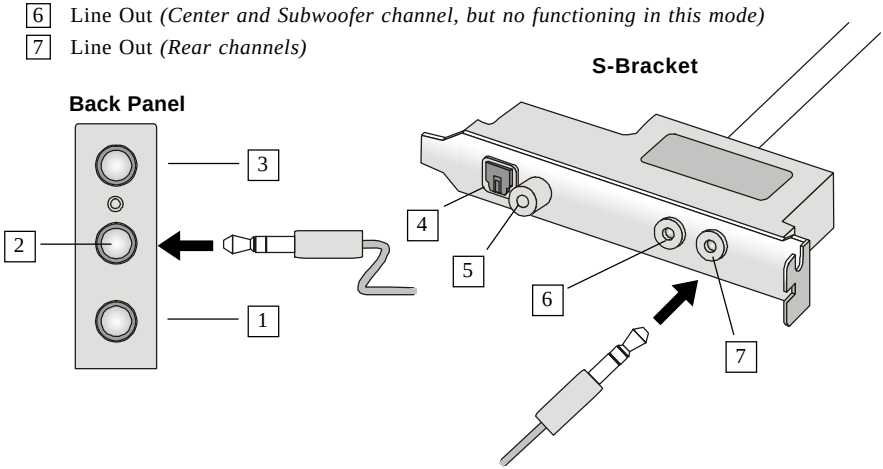
We recommend that you should still attach the speakers to BACK PANEL's Line Out connector during 2-channel audio mode even though S-Bracket's Line Out connectors function properly.



4-Channel Analog Audio Output

1. MIC
2. Line Out *(Front channels)*
3. Line In
4. Optical SPDIF jack
5. Coaxial SPDIF jack
6. Line Out *(Center and Subwoofer channel, but no functioning in this mode)*
7. Line Out *(Rear channels)*

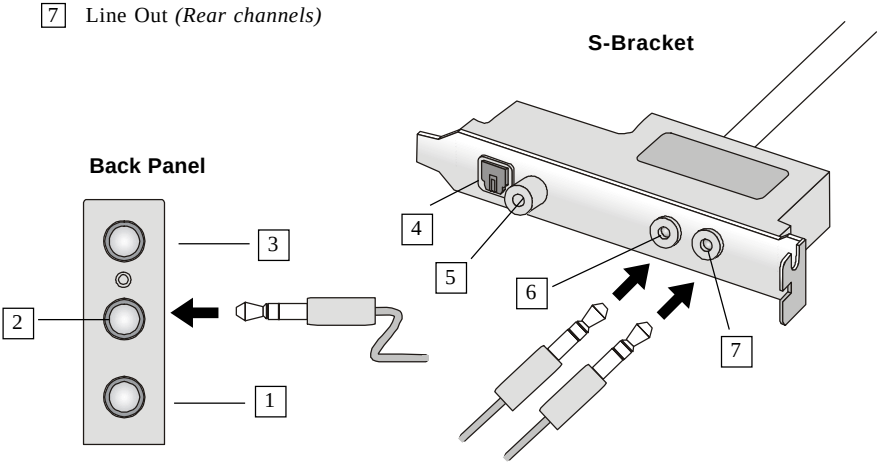
Description:
Connect two speakers to back panel's Line Out connector and two speakers to one Line Out connector of S-Bracket.



6-Channel Analog Audio Output

1. MIC
2. Line Out *(Front channels)*
3. Line In
4. Optical SPDIF jack
5. Coaxial SPDIF jack
6. Line Out *(Center and Subwoofer channel)*
7. Line Out *(Rear channels)*

Description:
Connect two speakers to back panel's Line Out connector and four speakers to both Line Out connectors of S-Bracket.



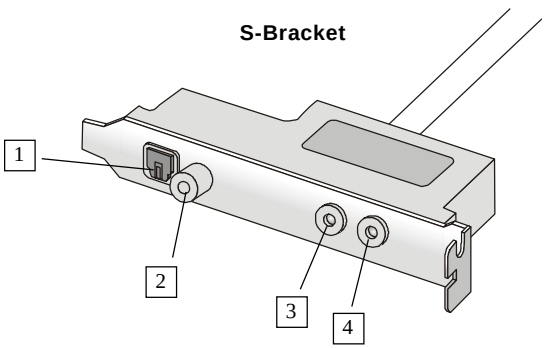
Digital Audio Output (2-Channel only)

For digital audio output, use the SPDIF (Sony & Philips Digital Interface) connectors supplied by *S-Bracket*. First, connect the SPDIF speakers to the appropriate SPDIF jack, and then select the audio channel you desire through the control panel of speakers. The SPDIF connectors support 2-channel audio operation only.

S-Bracket offers two types of SPDIF jacks: one for fiber-optic cable and the other for coaxial cable. Select the connector according to the type of your SPDIF speakers.

1 Optical SPDIF jack
2 Coaxial SPDIF jack
3 Line Out
4 Line Out

Description:
Select the correct type of SPDIF jack to connect SPDIF speakers. For optical connection, remove the plug from the S-Bracket before inserting the fiber-optic cable to it.



Appendix B: VIA VT8237 Serial ATA RAID Introduction

The Southbridge VT8237 provides a hybrid solution that combines two independent SATA ports for support of up to two Serial ATA (Serial ATA RAID) drives.

Serial ATA (SATA) is the latest generation of the ATA interface. SATA hard drives deliver blistering transfer speeds of up to 150MB/sec. Serial ATA uses long, thin cables, making it easier to connect your drive and improving the airflow inside your PC.

The key features of VT8237 SATA RAID are:

1. Support two SATA + two PATA hard disk drives.
2. Only SATA supports RAID.
3. Supports ATA 133 high performance hard disk drive.
4. Dual independent ATA channels and maximum connection of four hard disk drives allowed.
5. Supports Ultra DMA mode 6/5/4/3/2/1/0, DMA mode 2/1/0, and PIO mode 4/3/2/1/0.
6. Supports RAID 0 and RAID 1.
7. 4 KB to 64 KB striping block size support.
8. Bootable disk or disk array support.
9. Windows-based RAID configure and management software tool. (Compatible with BIOS)
10. Supports hot-swap failed disk drive in RAID 1 array.
11. ATA SMART function support.
12. Microsoft Windows 98, Me, NT4.0, 2000, XP operating systems support.
13. Event log for easy troubleshooting.

Introduction

This section gives a brief introduction on the RAID-related background knowledge and a brief introduction on VIA SATA RAID Host Controller. For users wishing to install their VIA SATA RAID driver and RAID software, proceed to **Driver and RAID Software Installation** section.

RAID Basics

RAID (Redundant Array of Independent Disks) is a method of combining two or more hard disk drives into one logical unit. The advantage of an Array is to provide better performance or data fault tolerance. Fault tolerance is achieved through data redundant operation, where if one drives fails, a mirrored copy of the data can be found on another drive. This can prevent data loss if the operating system fails or hangs. The individual disk drives in an array are called "members". The configuration information of each member is recorded in the "reserved sector" that identifies the drive as a member. All disk members in a formed disk array are recognized as a single physical drive to the operating system.

Hard disk drives can be combined together through a few different methods. The different methods are referred to as different RAID levels. Different RAID levels represent different performance levels, security levels and implementation costs. The RAID levels which the VIA VT8237 SATA RAID Host Controller supports are RAID 0 and RAID 1. The table below briefly introduced these RAID levels.

RAID Level	No. of Drives	Capacity	Benefits
RAID 0 (Striping)	2	Number drives * 2	Highest performance without data protection
RAID 1 (Mirroring)	2	Smallest size	Data protection

RAID 0 (Striping)

RAID 0 reads and writes sectors of data interleaved between multiple drives. If any disk member fails, it affects the entire array. The disk array data capacity is equal to the number of drive members times the capacity of the smallest member. The striping block size can be set from 4KB to 64KB. RAID 0 does not support fault tolerance.

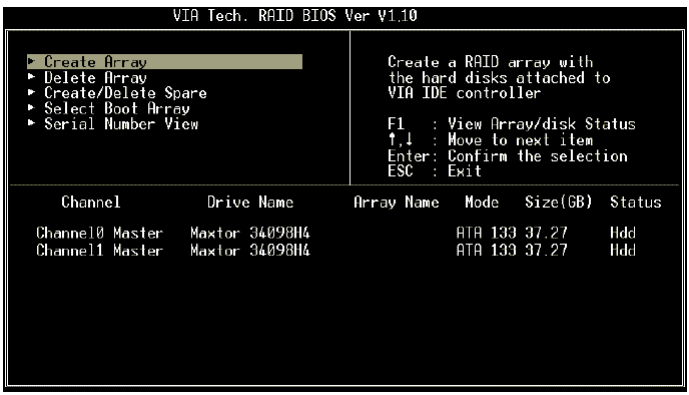
RAID 1 (Mirroring)

RAID 1 writes duplicate data onto a pair of drives and reads both sets of data in parallel. If one of the mirrored drives suffers a mechanical failure or does not respond, the remaining drive will continue to function. Due to redundancy, the drive capacity of the array is the capacity of the smallest drive. Under a RAID 1 setup, an extra drive called the .spare drive. can be attached. Such a drive will be activated to replace a failed drive that is part of a mirrored array. Due to the fault tolerance, if any RAID 1 drive fails, data access will not be affected as long as there are other working drives in the array.

BIOS Configuration

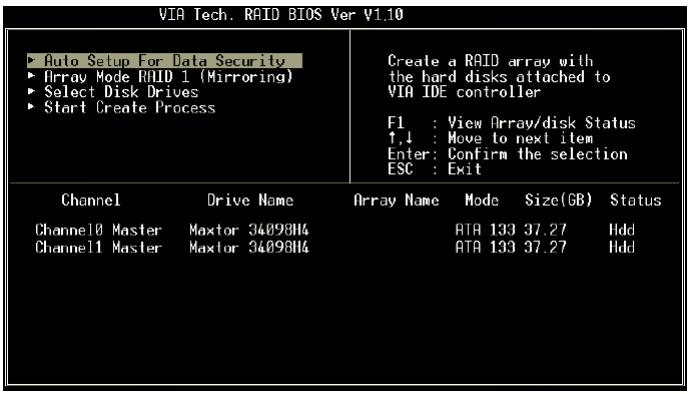
When the system powers on during the POST (Power-On Self Test) process, press <Tab> key to enter the BIOS configuration.

The Serial ATA RAID volume may be configured using the VIA Tech. RAID BIOS. Always use the arrow keys to navigate the main menu, use up and down arrow key to select the each item and press <Enter> to call out the list of creation steps. The main interface of BIOS configuration utility is as below:



Create Disk Array

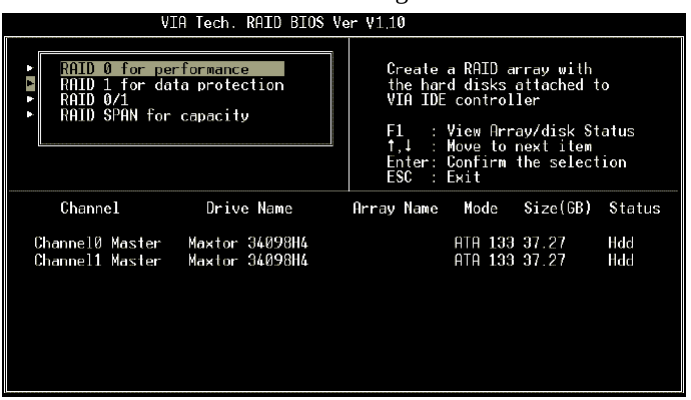
Use the up and down arrow keys to select the **Create Array** command and press <Enter>.



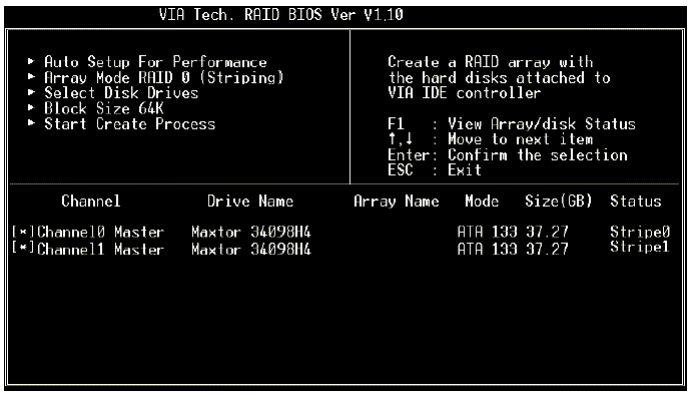
MSI Reminds You...

The "Channel", "Drive Name", "Mode" and "Size (GB)" in the following example might be different from your system.

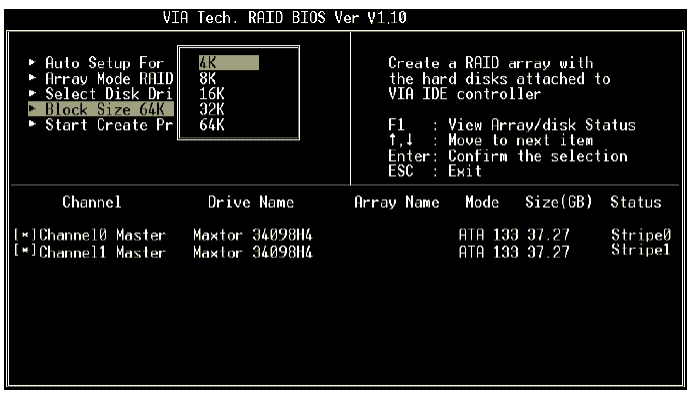
Select **Array Mode** and press <Enter>, a list of array modes will appear. Highlight the target array mode that you want to create, and press <Enter> to confirm the selection. If RAID 1 or RAID 0/1 is selected, an option list will popup and enable the users to select **Create only** or **Create and duplicate**. **Create only** will allow BIOS to only create an array. The data on the mirroring drive may be different from the source drive. **Create and duplicate** lets BIOS copy the data from the source to the mirroring drive.



After array mode is selected, there are two methods to create a disk array. One method is "**Auto Setup"** and the other one is "**Select Disk Drives"**. **Auto Setup** allows BIOS to select the disk drives and create arrays automatically, but it does not duplicate the mirroring drives even if the user selected **Create and duplicate** for RAID 1. It is recommended all disk drives are new ones when wanting to create an array. **Select Disk Drives** lets the user select the array drives by their requirements. When using **Select Disk Drives**, the channel column will be activated. Highlight the target drives that you want to use and press <Enter> to select them. After all drives have been selected, press <Esc> to go back to the creation steps menu.



If user selects a RAID 0 array in step 2, the block size of the array can also be selected. Use the arrow key to highlight **Block Size** and press <Enter>, then select a block size from the popup menu. The block size can be 4KB to 64KB.



MSI Reminds You...
Even though 64KB is the recommended setting for most users, you should choose the block size value which is best suited to your specific RAID usage model.

***4KB**: For specialized usage models requiring 4KB blocks*
***8KB**: For specialized usage models requiring 8KB blocks*
***16KB**: Best for sequential transfers*
***32KB**: Good for sequential transfers*
***64KB**: Optimal setting*

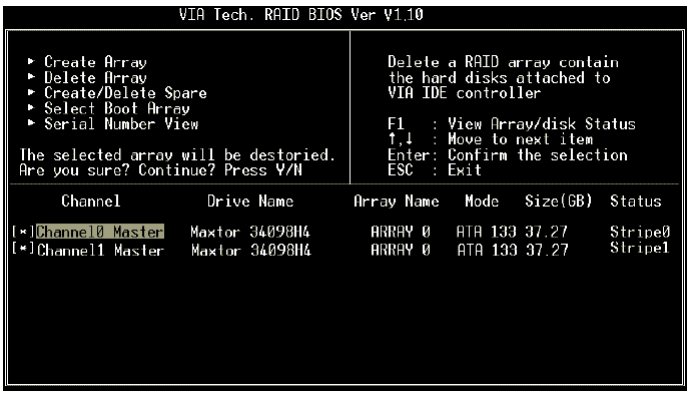
Use the arrow key to highlight **Start Create Process** and press <Enter>. A warning message will appear, Press **Y** to finish the creation, or press **N** to cancel the creation.

Important note: All existing content in the hard drive will be destroyed after array creation.

Delete Disk Array

A RAID can be deleted after it has been created. To delete a RAID, use the following steps:

1. Select **Delete Array** in the main menu and press <Enter>. The channel column will be activated.
2. Select the member of an array that is to be deleted and press <Enter>. A warning message will show up, press Y to delete or press N to cancel.

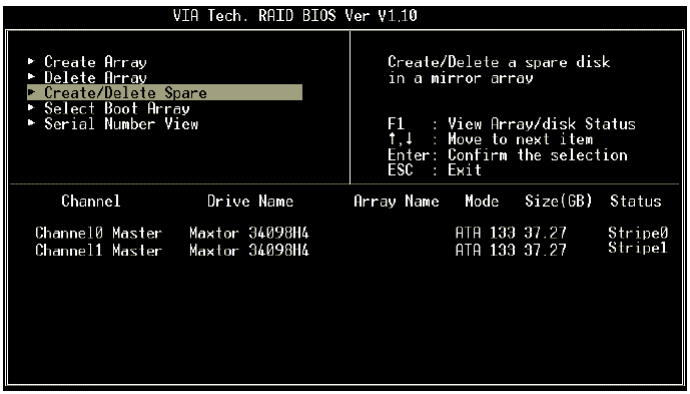


Deleting a disk array will destroy all the data on the disk array except RAID 1 arrays. When a RAID is deleted, the data on these two hard disk drives will be reserved and become two normal disk drives.

Create and Delete Spare Hard Drive

If a RAID 1 array is created and there are drives that do not belong to other arrays, the one that has a capacity which is equal to or greater than the array capacity can be selected as a spare drive for the RAID 1 array. Select **Create/Delete Spare** and press <Enter>, the channel column will then be activated. Select the drive that you want to use as a spare drive and press <Enter>, the selected drive will be marked as **Spare**. The spare drive cannot be accessed in an OS.

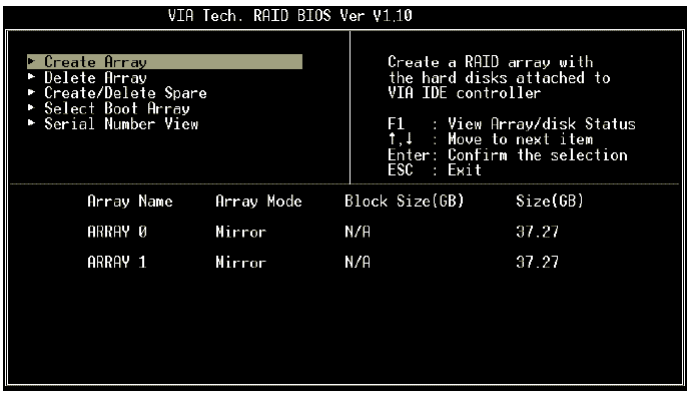
To delete a spare drive, highlight **Create/Delete Spare** and press <Enter>. The spare drive will be highlighted, press <Enter> to delete the spare drive.



View Serial Number of Hard Drive

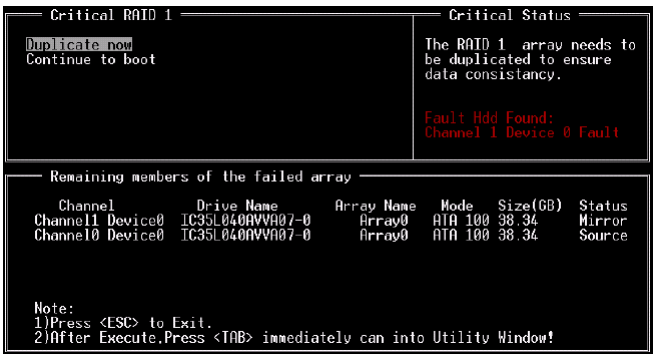
Highlight **Serial Number View** and press <Enter>. Use arrow key to select a drive, the selected drive's serial number can be viewed in the last column. The serial number is assigned by the disk drive manufacturer.

Press the **F1** key to show the array status on the lower screen. If there are no disk arrays then nothing will be displayed on the screen.



Duplicate Critical RAID 1 Array

When booting up the system, BIOS will detect if the RAID 1 array has any inconsistencies between user data and backup data. If BIOS detects any inconsistencies, the status of the disk array will be marked as critical, and BIOS will prompt the user to duplicate the RAID 1 in order to ensure the backup data consistency with the user data.



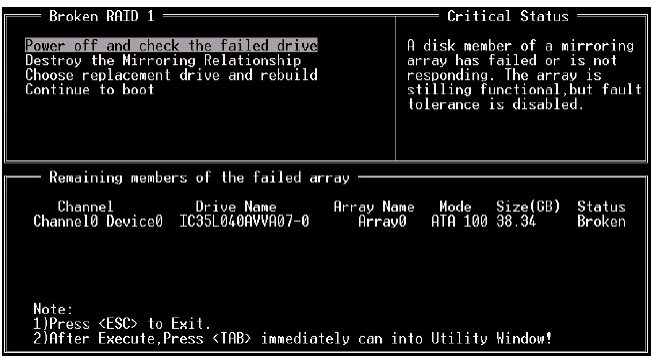
If user selects **Continue to boot,** it will enable duplicating the array after booting into OS.

Rebuild Broken RAID 1 Array

When booting up the system, BIOS will detect if any member disk drives of RAID has failed or is absent. If BIOS detects any disk drive failures or missing disk drives, the status of the array will be marked as broken.

If BIOS detects a broken RAID 1 array but there is a spare hard drive available for rebuilding the broken array, the spare hard drive will automatically become the mirroring drive. BIOS will show a main interface just like a duplicated RAID 1. Selecting **Continue to boot** enables the user to duplicate the array after booting into operating system.

If BIOS detects a broken RAID 1 array but there is no spare hard drive available for rebuilding the array, BIOS will provide several operations to solve such problem.



1. Power off and Check the Failed Drive:

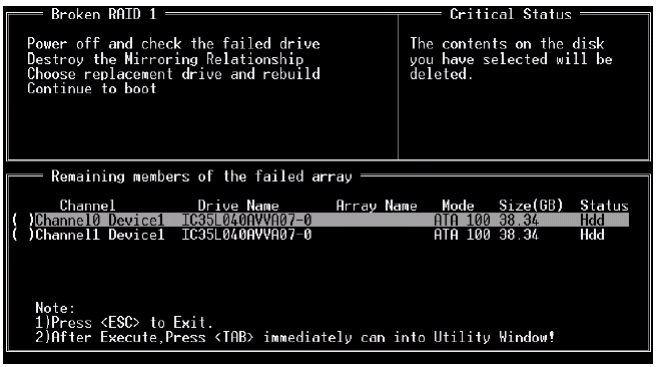
This item turns off the computer and replaces the failed hard drive with a good one. If your computer does not support APM, you must turn off your computer manually. After replacing the hard drive, boot into BIOS and select **Choose replacement drive and rebuild** to rebuild the broken array.

2. Destroy the Mirroring Relationship:

This item cancels the data mirroring relationship of the broken array. For broken RAID 1 arrays, the data on the surviving disk will remain after the destroy operation. However, **Destroy the Mirroring Relationship** is not recommend because the data on the remaining disk will be lost when the hard drive is used to create another RAID 1 array.

3. Choose Replacement Drive and Rebuild:

This item enables users to select an already-connected hard drive to rebuild the broken array. After choosing a hard drive, the channel column will be activated.



Highlight the target hard drive and press <Enter>, a warning message will appear. Press **Y** to use that hard drive to rebuild, or press **N** to cancel. Please note selecting option **Y** will destroy all the data on the selected hard drive.

4. Continue to boot:

This item enables BIOS to skip the problem and continue booting into OS.

Installing RAID Software & Drivers

Install Driver in Windows OS

➤ **New Windows OS (2000/XP/NT4) Installation**

The following details the installation of the drivers while installing Windows XP.

1. Start the installation:

Boot from the CD-ROM. Press **F6** when the message "Press F6 if you need to install third party SCSI or RAID driver" appears.

2. When the Windows Setup window is generated, press **S** to specify an Additional Device(s).

3. Insert the driver diskette ***VIA VT6420/VT8237 Disk Driver*** into drive A: and press <Enter>.

4. Depending on your operation system, choose ***VIA Serial ATA RAID Controller(Windows XP)***, ***VIA Serial ATA RAID Controller(Windows 2000)*** or ***VIA Serial ATA RAID Controller(Windows NT4)*** from the list that appears on Windows XP Setup screen, press the <Enter> key.

5. Press <Enter> to continue with installation or if you need to specify any additional devices to be installed, do so at this time. Once all devices are specified, press <Enter> to continue with installation.

6. From the Windows XP Setup screen, press the <Enter> key. Setup will now load all device files and then continue the Windows XP installation

➤ **Existing Windows XP Driver Installation**

1. Insert the MSI CD into the CD-ROM drive.
2. The CD will auto-run and the setup screen will appear.
3. Under the Driver tab, click on ***VIA SATA RAID Utility***.
4. The drivers will be automatically installed.

➤ **Confirming Windows XP Driver Installation**

1. From Windows XP, open the **Control Panel** from **My Computer** followed by the System icon.

2. Choose the **Hardware** tab, then click the **Device Manager** tab.

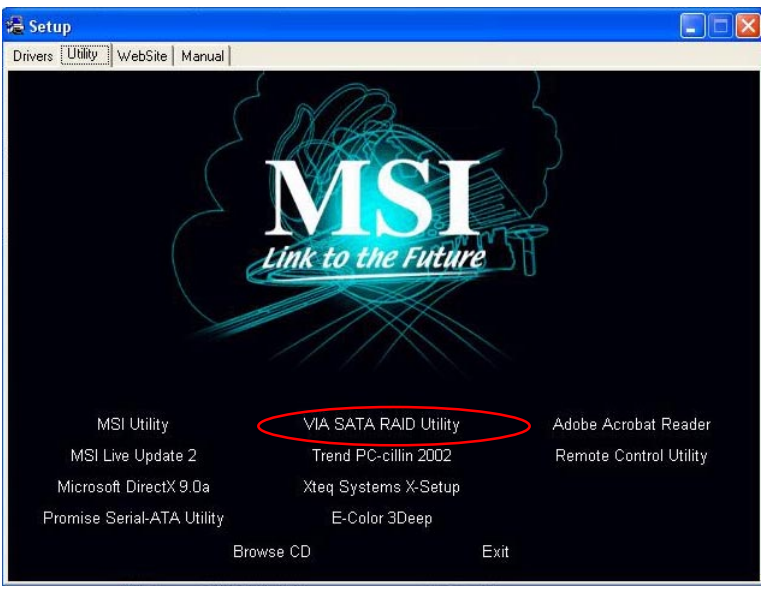
3. Click the "+" in front of the **SCSI and RAID Controllers** hardware type. The driver ***VIA IDE RAID Host Controller*** should appear.

Installation of VIA SATA RAID Utility

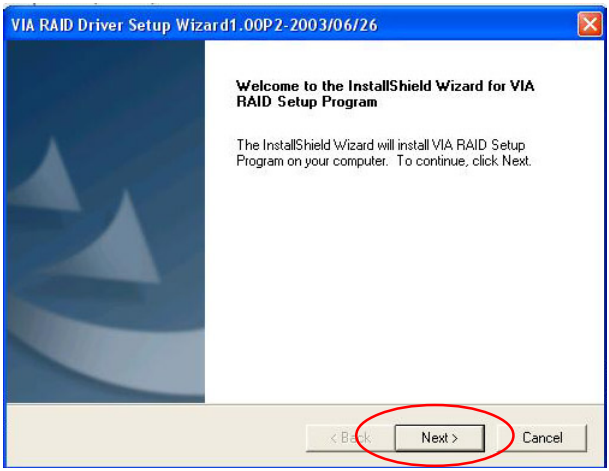
The VIA SATA RAID Utility is the software package that enables high-performance RAID 0 arrays in the Windows* XP operating system. This version of VIA SATA RAID Utility contains the following key features:

- ➤ Serial ATA RAID driver for Windows XP
- ➤ VIA SATA RAID utility
- ➤ RAID0 and RAID1 functions

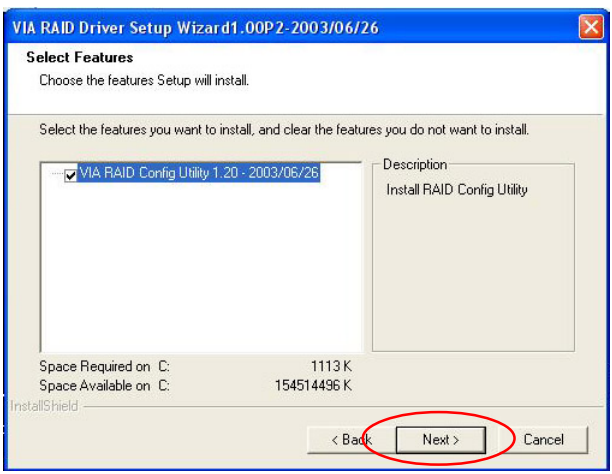
Insert the MSI CD and click on the **VIA SATA RAID Utility** to install the software.



The **InstallShield Wizard** will begin automatically for installation. Click on the **Next** button to proceed the installation in the welcoming window.

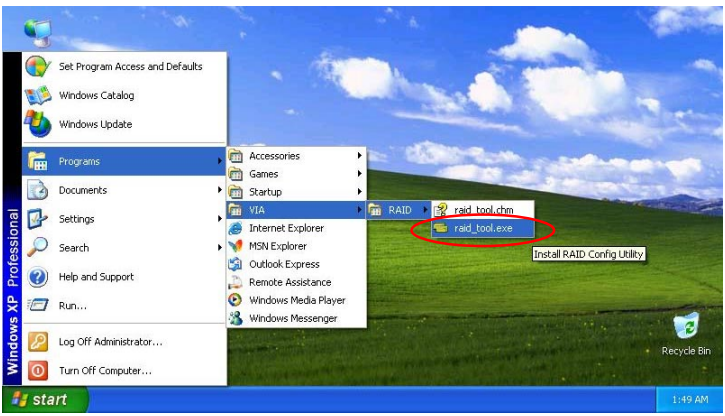


Put a check mark in the check box to install the feature you want. Then click **Next** button to proceed the installation.



Using VIA RAID Tool

Once the installation is complete, go to **Start** ---> **Programs** --->**VIA** --->**raid_tool.exe** to enable **VIA RAID Tool**.



After the software is finished installation, it will automatically started every time Windows is initiated. You may double-click on the icon shown in the system tray of the tool bar to launch the **VIA RAID Tool** utility.

The main interface is divided into two windows and the toolbar above contain the main functions. Click on these toolbar buttons to execute their specific functions. The left windowpane displays the controller and disk drives and the right windowpane displays the details of the controller or disk drives. In KT6 Delta, the available features are as following:

View by Controller

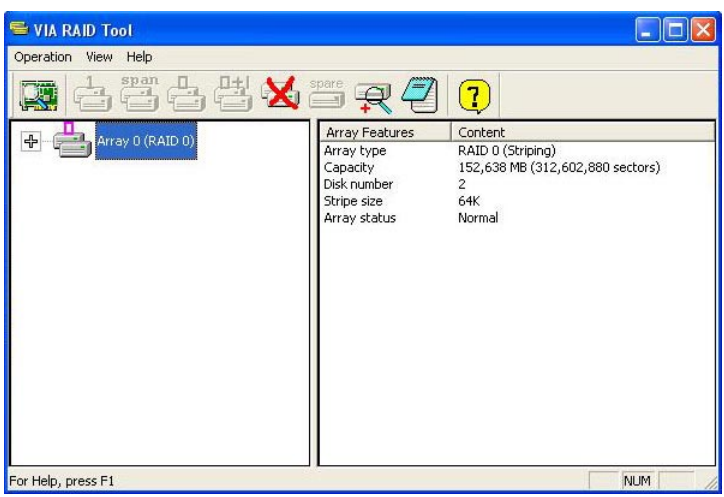
View by Devices

View Event log

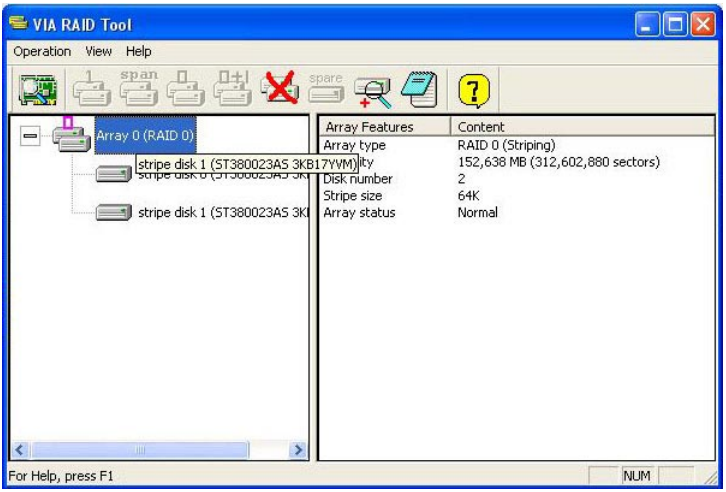
Help Topics

It means that VT8237 SATA RAID in KT6 Delta only has the feature of monitoring the statuses of RAID 0 and RAID 1.

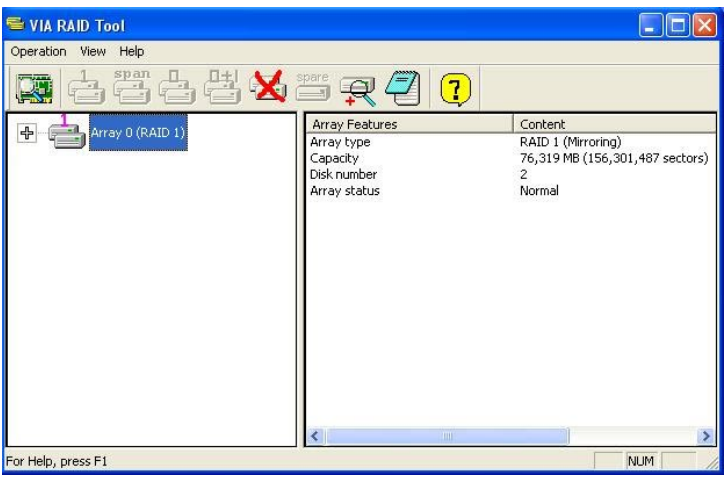
Click on o r button to determine the viewing type of left window pane. There are two viewing types: By controllers and by device. Click on the object in the left window pane to display the status of the object in the right windowpane. The following screen shows the status of Array 0---RAID 0.



Click on the plus (+) symbol next to Array 0---RAID 0 to see the details of each disk.



You may also use the same o r button to view the statuses of Array 0---RAID 1.



Click on the plus (+) symbol next to Array 0---RAID 1 to see the details of each disk.